THE

PLANTS AND DRUGS OF SIND;

BEING

A SYSTEMATIC ACCOUNT, WITH DESCRIPTIONS,
OF THE INDIGENOUS FLORA,

AND

NOTICES OF THE VALUE AND USES OF THEIR PRODUCTS
IN COMMERCE, MEDICINE, AND THE ARTS.

BY

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TO

JOSEPH CAMPBELL, ESQ.,

DEPUTY AGENT OF THE SIND, PUNJAUB, AND DELHI RAILWAY,—

AND FOR TEN YEARS CONNECTED WITH THE

KURRACHEE MUNICIPAL MUSEUM

AS MEMBER AND PRESIDENT,—

WHO ORIGINATED

THE ILLUSTRATIVE COLLECTION OF ECONOMIC PRODUCTS

NOW EXISTING IN THE INSTITUTION,

AND TO WHOSE UNVARIED INTEREST, ENCOURAGEMENT, AND MATERIAL

ASSISTANCE IS DUE ITS DEVELOPMENT;

THIS ATTEMPT

TO RENDER THE SUBJECT OF ECONOMIC BOTANY MORE INTERESTING TO THE

PUBLIC, MORE VALUABLE TO THE STUDENT, AND GENERALLY CONDUCIVE

TO THE STUDY OF THE SCIENCE,

BY CONNECTING THE DESCRIPTIONS OF THE SOURCES OF THE PRODUCTS WITH

THEIR VALUE IN COMMERCE, MEDICINE, AND THE ARTS,

IS MOST GRATEFULLY

DEDICATED BY

THE AUTHOR.

PREFACE.

THIS WORK may be regarded as a descriptive Index to the Sind Flora, and a handbook to the drugs and economic products in use by native practitioners and others in the province and neighbouring countries.

It may be mentioned that the idea did not originate wholly with the author; but besides the want experienced by him of a Guide to the known Flora of Sind, when making a collection of drugs for the Kurrachee Museum, there was a general conviction among those interested in economic botany, that some work comprehending the subject within a moderate compass was a desideratum; 1st, as supplying descriptions of known plants for the enquirer; and, 2ndly, facilitating by such descriptions the work of those interested in medical and economic botany, as it was clearly evident there were numerous vegetable products in common use in the province, the sources of which were either uncertain or unknown for want of a scientific Guide. In fact the only notices of the Flora at all accessible for reference were a list of some plants in the *Sind Selections* by Dr. Stocks, and a few others scattered in various journals. With a view to relieving others from the inconvenience the author had himself encountered, and with the object of collecting and collating such scattered information, with the addition of the results of his own observations, into a systematic account of the vegetable productions of the province, arranged according to some natural system, accessible to all and based on the materials within the author's reach, this work was undertaken. Though strictly speaking *scientific*, it has been rendered as popular as possible by freeing it as much as practicable of technicality so as to make it more appreciable by the general reader.

The system of arrangement is twofold: 1st, according to the *Natural* system of Lindley in his "Vegetable Kingdom," which, up to the present, is the most complete, most generally accessible, and least expensive, and therefore perhaps the most valuable one to the reader; and 2ndly, the *Linnean* system, which, though not modern, commends itself as being so simple as to be available to the least scientific enquirer as a means of identification. To aid reference to Balfour's System, his Natural Order Numbers are placed immediately after Lindley's.

Each plant, whether indigenous or the source of a foreign drug, bears its scientific as well as its trivial English name, besides the

vernacular ones by which it is known in the different countries where it may be distributed. In the case of *indigenous* plants, a full botanical description is given of each, also its habitat, distribution, &c., and the various uses of its economic products are treated of, with, in many instances, analyses of those used in medicine; but in the case of plants which are sources of drugs found in Sind, but *not indigenous*, besides notices of their uses, &c., of their products, except when not previously described, or when the works in which they have been described are not accessible, a succinct but sufficiently characteristic description only is given, with references to works in which fuller ones may be found.

Besides the foregoing there are added to the work :—

1st,—A synopsis of the natural orders of the system adopted, with characters of the genera of the indigenous plants.

2nd,—A general index, limited to the scope of the work.

3rd,—And lastly, a catalogue of all the drugs obtainable in Sind, added at the special request of the Government of Bombay, on the suggestion of Dr. H. V. Carter, Professor of Botany.

Numerous valuable works have (with due acknowledgments) been laid under contribution in preparing this compilation, as Dr. Brandis' clear and accurate descriptions of the Forest Flora N. W. P., Griffith's Notula ad Plantas Asiaticus, Dr. Stewart's Punjab Plants, Wight's Icones Plantarum, Royle's Materia Medica, Pharmacopœia, Pharmacopœia of India, and a number of others in which scattered information existed in regard to the products treated of. Information in regard to the Flora of Sind being limited, the author's own notes were used, with Hooker's Flora of British India up to part 7, in which numerous plants included in the Flora are described, the result of the labors of several botanists who have explored the country, and who, according to Hooker and Thompson,* were—1st, Major Griffiths, who traversed the upper part of the province on his way to Afghanistan; 2nd, Major Viccary; and lastly, Dr. Stocks, to whom is due our most complete knowledge of the Flora, and to whom the authors of *Flora Indica* fittingly pay tribute.

From the results of the labours of those explorers and with the materials before them, it has been roughly estimated by Hooker and Thompson, that "more than nine-tenths of the Sind vegetation consists of plants which are indigenous in Africa, the desert regions assimilating with that country, and owing to the remarkable identity of soil and climate with those countries, Nubian, Persian, Egyptian and Southern Arabian plants also occur largely in the Flora. At least one half are common

* Flora Indica.

Nubian or Egyptian plants, which, being indifferent to moisture, are also found distributed in various parts of India where the climate is suitable. As examples, may be mentioned *Gynandropsis pentaphylla*, *Abutilon indicum*, *Tribulus terrestris*, *Tephrosia purpurea*, *Glinus lotoides*, *Grangea Madraspatana*, *Trichodesma indicum*, *Lippia nodiflora*, *Solanum Jacquinii*, *Ærua lanata*, *Achyranthes aspera*, and others. A smaller but still considerable number is common to *tropical* Africa. Among these are found many *Convolvulaceæ*, and some of the commonest Indian weeds, as *Peristrophe bicaliculata* and several species of *Corchorus* and *Triumfetta*. Again, about one-sixth of the whole consist of common Egyptian plants which are too intolerant of moisture to withstand the climate of the more humid parts of India, but which extend along the Arabian and Persian coasts to Sind and thence to the Punjab and the drier parts of the Gangetic Plain, and some even to the Deccan and Mysore, *e. g.* *Peganum harmala*, *Cocculus leœba*, *Capparis aphylla*, *Alhagi maurorum*, *Fagonia arabica*, *Prosopis spicigera*, *Calotropis procera*, and others, which extend to the drier parts of the Peninsula; and *Malcolmia africana*, *Corchorus depressus*, *Cucumis colocynthis*, *Berthelotia lanceolata*, *Heliotropium undulatum*, several species of *Salvia* and chenopods which are confined to Northern India. With these occur also a few central European plants, as *Ranunculus sceleratus*, *Convolvulus arvensis*, *Heliotropium Europœum*, *Rumex obtusifolius*, and *Potamogeton pectinatum*. Besides these Sind contains a considerable number of species which have not been met with elsewhere in India, but which are Arabian or Nubian plants; such are *Zygophyllum simplex et album*, *Neurada procumbens*, *Aizoon canariense*, *Trichodesma africanum*, several *Barleria*, *Balsamodendron* and *Acanthodium hirtum*. *Puneria coagulans* (Stocks) is confined to Sind and the neighbouring province of Beloochistan. Eastern species, which find their western limit in Sind, are almost entirely wanting. The following are all that are contained in Dr. Stocks' catalogue, excluding plants manifestly cultivated (such as *Tamarindus*),—*Rhus mysorensis*, *Zizyphus jujuba*, *Hedyotis aspera*, *Coldenia procumbens*, *Salvia plebeia*, *Clerodendron phlomoides*, *Aristolochia bracteata*, and *Zeuxine sulcata*."

There are, however, a considerable number of species which have not been met with in Egypt or Arabia, but which belong to genera characteristic of those countries and are closely related to Egyptian species. Instances of this kind are *Crotalaria Burhia*, *Dicoma lanuginosus*, *Leptadenia Jacquemontiana*, *Oxystelma esculentum*, &c. &c.

Moreover, we meet with *Olea ferruginea* on the hills west of the province, with *Monsonia lawiana*, and others characteristic of the flora of Afghanistan.

Having briefly explained the scope and extent of the work, it now only remains for the author to record his gratitude for the assistance he has had accorded in many ways during its progress. Though seemingly simple, it has involved considerable labor and research, and could not have been successfully accomplished without valuable aid. Among those to whom the author is under obligation, he would be permitted to name specially Dr. Wellington Gray, M.B., Professor of Botany, for many valuable suggestions; also to Drs. H. Cook, H. V. Carter, and Succaram Arjoon, Professors of Botany in the Grant Medical College, to whom the manuscript was submitted by the Government of Bombay for report; Joseph Campbell, Esq., Deputy Agent of the Sind, Punjab and Delhi Railway, and President of the Kurrachee Museum, to whom this work is dedicated; the Managing Committee of the Kurrachee Museum; and lastly, to the late lamented Sir William Lockyer Merewether, whose assistance was given in precisely the most important direction, viz., by granting the free use of many most important books and papers on the various subjects which would have been otherwise inaccessible to the author, many of them in his own private library, and either not purchasable, or only to be obtained at considerable cost. To this liberality in fact is due much of the important information gathered into the following pages which could not otherwise have appeared, and which adds materially to their value.

The author trusts that this small effort will find public favor. It is complete so far as the present state of observations recorded allows; but there is a wide field left for future labourers. These will no longer, however, have to search far and wide, and too often vainly, for what has been done by their predecessors, but may add to the record their own observations, it may be correcting errors or adding facts, but finding in this unpretending manual a foundation-stone for the completion of a more perfect work at some future date, when further investigations and discoveries call for a new "Botany of the Province of Sind."

Kurrachee, 10*th May* 1881.

SYNOPSIS OF NATURAL ORDERS AND GENERIC CHARACTERS.

CLASS I.—THALLOGENS.

ALLIANCE 1. *ALGALES.*

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II **CONFERVACEÆ,**—*CONFERVADS*—*Vesicular, filamentary or membraneous bodies multiplied by zoospores generated in the interior at the expense of their green matter* 1

1 **Ulva,** *Linn* Frond polysiphonous, membranaceous, green Fructification, minute granules mostly arranged in fours 1

2 **Porphyra,** *Ag* Frond polysiphonous, thin, purple. Reproductive organs, roundish granules in fours covering the frond, or scattered sori of ovate granules 2

III **FUCACEÆ,**—*SEA-WRACKS*—*Cellular or tubular unsymmetrical bodies, multiplied by simple spores formed externally, contained in superficial cells, which are often bladdery Vessels scattered throughout the whole frond, or seated in particular parts* 2

1 **Sargassum,** *Ag* Frond with distinct, stalked, nerved leaves. Air vessels simple, axillary, stalked Receptacles small, linear, tuberculated, mostly in axillary clusters Seeds in distinct cells 2

2 **Fucus,** *Linn* Frond plane, with or without a midrib compressed or cylindrical, linear, dichotomous, coriaceous Air vessels, when present, innate in the frond, simple and large Receptacles terminal, (except in *F nodosus*), turgid, containing tubercles embedded in mucus, and discharging their seeds by conspicuous spores 2

3 **Laminaria,** *Lam.* Frond stipitate, coriaceous, or membranaceous, flat, undivided, or irregularly cleft, ribless Fructification, clouded spots of spores, embedded in the thickened substance of some part of the frond 3

4 **Zonaria,** *Areschoug* Root coated with woolly fibres Frond flat, ribless, fan-shaped, entire or cleft, marked at regular distances with concentric lines, and fringed with articulated filaments, apex involute Fructification, linear, scattered, concentric sori 4

5 **Dictyota,** *Lamour* Frond flat, reticulated, membranaceous, dichotomous, or irregularly cleft Root filamentous Fructification composed of variously aggregated, somewhat prominent seeds, on both surfaces of the frond 4

6. **Chordaria,** *Linn* Frond polysiphonous, cartilaginous, filiform, solid. Axis composed of densely packed, longitudinal, interlaced filaments Periphery of simple, club-shaped, whorled spores, seated among the filaments. Fructification, obovate spores 4

7 **Bryopsis,** *Lamour* Frond membranaceous, filiform, tubular, cylindrical, branched, the branches imbricated or distichous and pinnated, filled with a fine green granuliferous fluid 4

8. **Codium,** *Stackhouse* Frond green, sponge-like, globular, cylindrical or flat, simple or branched, composed of tubular, interwoven, articulate filaments Reproductive vesicles attached to filaments ... 5

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IV **CERAMIACEÆ,**—*ROSETANGLES.—Cellular or tubular unsymmetrical bodies multiplied by tetraspores* 5

1 **Callithamnion,** *Ag.* Frond rosy or brownish red, tubular, jointed, filamentous. Reproductive organs, external tetraspores scattered along the ultimate branchlets, or roundish berry-like receptacles (favellæ) seated on the main branches containing semitransparent granules 5

2. **Ceramium,** *Roth.* Filaments articulated, dichotomous, reticulated with veins Fructification, capsules with a membraneous pericarp, simple or lobed, or oblong granules partially embedded in the joints of the lesser ramuli... 6

3 **Chondrus,** *Stackhouse.* Frond cartilaginous, cellular, flat, dichotomous, purplish or livid red. Fructification, prominent tubercles of radiating filaments or tetraspores collected into sori, immersed in the frond 6

4 **Rhodymenia,** *Grev.* Frond membranaceous, fine pink or red, veinless. Fructification, hemispherical capsules or minute ternate granules spreading over the whole or part of the frond 6

ALLIANCE 2. *FUNGALES.*

Cellular, flowerless plants nourished through their thallus, living in air; propagated by spores, colorless or brown.—*Lind.* 7

VI. **HYMENOMYCETES,**—*TOADSTOOLS.—Spores generally quaternate on distinct sporophores, hymenium naked* 7

1. **Agaricus** 7

CLASS II.—ACROGENS.

ALLIANCE 6. *FILICALES.*

XXIV. **POLYPODIACEÆ,**—*FERNS.—Filical acrogens with ringed sporecases, growing on the back or edge of the leaves, distinct and splitting irregularly* (*Lind.*) 7

1. **Adiantum,** *Linn.* Sporecases stalked with a vertical ring; spores roundish 8

CLASS IV.—ENDOGENS.

ALLIANCE 7. *GLUMALES.*

XXIX. **GRAMINACEÆ,**—*GRASSES.—Annual, herbaceous plants. Rhizomes fibrous or bulbous. Stems cylindrical, jointed, hollow, sometimes solid. Leaves narrow, alternate. Sheaths split. Flowers hermaphrodite, sometimes unisexual or polygamous, either solitary or arranged in spikes, or panicled locustæ consisting of imbricated bracts. Outer glumes or bracts usually 2, alternate Palæa 2, alternate. Stamens hypogynous, 1–6 or more. Anthers versatile, 2-celled. Ovary 1-celled with 2 or more distinct (or united) styles. Ovule ascending. Embryo lateral, naked* 8

1. **Leersia,** *Soland.* Calyx, glume 2-valved, 1-flowered. Corol none 8

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2. **Alopecurus,** *Linn.* Calyx, glume 1-2 flowered, 3-valved; exterior valvelets minute 9

3. **Panicum,** *Schreb.* Calyx, glume 1-2 flowered, 3-valved. Spikes simple, paired, fascicled or panicled 9

4. **Pennisetum,** *Rich.* Same as Panicum. Involucre alternate, feathery 10

5. **Cenchrus,** *Schreb.* Involucre echinate, 4-flowered. Calyx, glume 2-3 valved, 1-2 flowered 10

6. **Aristida,** *Linn.* Calyx 2-valved, 1-flowered. Corol one-valved with three awns at top 10

7. **Arundo,** *Linn.* Calyx 2-valved, surrounded with long hairs or bristles 10

8. **Cynodon,** *Rich.* Glumes rough, spreading, calyx 2-valved... 10

9. **Dactylotenium,** *Willd.* Calyx 2-valved, containing flowers of 2 equal valvelets. Seed with a membraneous aril 11

10. **Poa,** *Linn.* Calyx 2-valved, containing many flowers of 2 unequal valvelets disposed alternately on distichous spikelets 11

11. **Dinebra,** *Forsk.* Spikes 2-flowered, calyx 1-flowered, palæa bifid 11

12. **Saccharum,** *Linn.* Calyx 1-flowered, two-valved, girt at base with wool 12

13. **Chloris,** *Sw.* Polygamous. Calyx 2-valved, 2–6 flowered; hermaphrodite flowers sessile; male or neuter ones pedicelled. Corol of hermaphrodite flower 2-valved; of the male or neuter 1-valved; all awned 12

14. **Andropogon,** *Linn.* Polygamous. Flowers in pairs, hermaphrodite, sessile. Calyx 2-valved, 1-flowered. Corol usually 2-valved, and generally awned. Male or neuter pedicelled, calyx as in the hermaphrodite. Corolla generally 2-valved; awnless... ... 13

15. **Digitaria,** *Juss.* Calyx 2-valved, 1-flowered. Corol 2-valved, awned 14

16. **Phalaris,** *Linn.* Calyx 2–3 valved. Corol 2 valved resupine. Inner valvelet of calyx armed with hooked bristles... ... 14

XXX. **CYPERACEÆ,**—*SEDGES.*—*Grass-like tufted plants, with fibrous roots. Leaves narrow, entire. Inflorescence capitate. Flowers monœcious without a perianth each on a solitary bract. Lower bracts empty. Calyx none. Stamens hypogynous, definite,* 1-12, *commonly* 3 *Anthers entire,* 2-*celled. Ovary* 1-*seeded, superior, surrounded by setæ. Ovule erect, anatropal. Style single* 2-3 *cleft. Stigmas undivided, sometimes bifid* 15

1. **Cyperus,** *Linn.* Glumes chaffy, bifariously imbricated. Corol none. Seed one, naked 15

2. **Scirpus,** *Linn.* Glumes chaffy, imbricated on all sides. Seed one, Corol none. 16

3. **Mariscus** (*Kyllingia*). Ament imbricated. Flowers with calyx and corol of 2 chaffy valves each. Seed one 16

4. **Typha,** *Linn.* Male ament cylindric, compact Perianth filiform. Corol none, female ament cylindric beneath that of males. Perianth of several fine filaments. Corol none. Seed one 16

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XXXVIII. **PALMACEÆ.**—*PALMS.—Arborescent, simple, shrubby, rough with scars of fallen leaves. Leaves clustered, usually very large, pinnate or flabelliform. Spadix scaly, terminal, often branching, enclosed in a one or many-valved spathe. Flowers generally diœcious, monœcious or polygamous, rarely bisexual, supported by scaly bracts. Sepals 3, persistent. Ovary free, 3-celled, 1 ovule in each cell; sometimes 3 distinct 1-celled carpels* 17

1. **Chamærops,** *Linn.* Leaves fanshaped, in a rounded terminal crown. Petioles sheathing. Flowers yellow, polygamous, often diœcious in compound panicles without bracts. Carpels 3, distinct ... 18

2. **Phœnix,** *Linn.* Leaves pinnate, leaflets entire, petiole on a short reticulate fibrous sheath; flowers diœcious in long spikes at the end of a woody peduncle. Carpels 3; fruit fleshy, 1-seeded, enclosing a hard seed with bony albumen 18

LVI. **COMMELYNACEÆ,**—*SPIDERWORTS.—Herbaceous plants. Leaves flat, narrow, usually sheathing at the base. Sepals 3. Petals colored Stamens 6. Ovary 3-celled, stigma 1. Capsule 2-3 celled, 2-3 valved* 22

1. **Commelyna,** *Schreb.* Calyx inferior, 3 leaved. Corol 3-petalled. Seeds 1 or more, embryo simple, with a perisperm 22

LXII **LILIACEÆ,**—*LILYWORTS.—Herbaceous plants or shrubs, with bulbs, tubers, rhizomes, or fibrous roots. Leaves narrow, in some cases expanded into a broad blade, not articulated with the stem Flowers large, white, pink or green. Stamens 6. Anthers opening inwards. Ovary free, 3-celled, many seeded Style 1, Stigma simple or 3-lobed Fruit capsular, 3-celled* 23

1. **Asphodelus,** *Linn.* Corol 6-parted. Nectary 6-valved, covering the genitals 23

LXVI. **JUNCAGINACEÆ,**—*ARROW-GRASSES.—Herbaceous aquatic plants. Leaves narrow, grassy or broad with parallel veins; flowers white or green, in spikes or racemes. Stamens 6. Anthers usually turned outwards. Carpels 3-6. Ovules 1-2, erect or pendulous. Fruit 1-2 seeded* 24

1. **Potamogeton,** *Linn* Calyx none. Corol 4-petalled. Germs 4. Styles none. Seeds 4. Embryo hooked without perisperm 24

LXXIV. **PINACEÆ.**—*CONIFERS.—Evergreen shrubs or trees, abounding in resin Ligneous tissue of wood marked with circular disks on the sides parallel to the rays. Leaves linear, alternate, rigid, subulate, scale-like, rarely with a broad blade; stipules none. Flowers naked, monandrous or monadelphous. Male flowers in deciduous catkins. Female flowers solitary, capitate or in cones. Ovary spread open, arising from the axil of a membraneous bract. Fruit, a cone formed of scale-shaped ovaries. Seed hard, crustaceous. Embryo in fleshy, oily albumen with 2 or more opposite, whorled cotyledons* 25

1. **Juniperus,** *Linn.* Female catkins ovoid, of 3-6 coalescent scales, fleshy in fruit, ripening the second year, forming a 1-3 seeded berry 26

LXXVI. **GNETACEÆ,**—*JOINT FIRS.—Small much-branched trees, or shrubs. Secreting watery, not resinous matter. Leaves opposite, entire, with simple, anastomosing, reticulated veins. Ligneous tissue of wood marked with circular disks. Flowers ♂ ♀ in heads or catkins. ♂ Flowers of 2-8 monadelphous stamens enclosed in a bifid sheathing perianth. Anthers 1-2 celled, ♀ Flowers naked or sheltered by a false calyx of 2 scales. Fruit 1-2 seeded, enclosed in a more or less succulent, persistent, and fleshy bract. Embryo dicotyledonous, in the middle of fleshy albumen* 27

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1. **Ephodra**,—*Tourn.* Shrubs or undershrubs. Stems nodose, articulated. Leaves membranceous with 2 opposite, sometimes linear lobes. Flowers diœcious, rarely monœcious in terminal and lateral sessile spikes. Male flowers in the axils of opposite bracts; forming an ovoid 4–20 flowered spike. Anthers 2–10, 2-celled. Female spike of 2 flowers. Seeds 1–2... 27

LXXX. **SALICACEÆ**,—*WILLOW-WORTS.—Trees or shrubs, short-lived. Leaves alternate, simple, with deliquescent primary veins, stipulate; stipules deciduous or persistent. Flowers diœcious, naked, or with a membraneous, cup-like calyx. Male flowers with distinct, or monodelphous stamens; Anthers 2-celled. Female flowers with a 1-celled ovary consisting of 2–4, generally 2 connate carpels. Fruit leathery, 1-celled, 2-valved, many seeded. Seeds numerous, minute, adhering to the lower part of the axis of each valve, and covered with long silky hairs.* 28

1. **Salix**, *Tournef.* Leaves short-petiolate, scales entire; stipules deciduous; stamens 2-12, generally 2, long exserted; capsule 2-valved. 28

2. **Populus**, *Tournef.* Leaves long-petiolate, broad, rarely lanceolate or linear. Scale of catkins caducous, cut or jagged. Stamens 4–30 inserted on the disk. Capsule 2–4 valved 29

XC. **EUPHORBIACEÆ**,—*SPURGEWORTS.—Trees, shrubs, or herbaceous plants, often abounding in acrid milk. Leaves opposite or alternate, simple, rarely compound, often stipulate. Flowers unisexual, axillary or terminal, arranged in various ways, sometimes enclosed within an involucre resembling a calyx. Stamens various. Ovary superior, 3-celled, rarely more, or 2 or 1 celled. Styles as many as carpels, free or connate, usually stigmatose on the ventral face; ovules solitary or twin, pendulous. Fruit capsular, generally tricoccous and separating from their common axis, occasionally succulent or dehiscent. Seed solitary or twin. Embryo inclosed in a fleshy albumen. Cotyledons flat. Radicle superior* 32

1. **Euphorbia**, *Linn.* Small soft-wooded trees or shrubs, with fleshy branches abounding in milky juice. Leaves alternate, without stipules, or with stipular spines, in some species opposite and stipulate. Flower heads resembling single flowers consisting of a calyx-like cup-shaped involucre, including several male flowers and 1 central female flower. Capsule separating into 3, two-valved cocci 32

2. **Croton**, *Linn.* Trees, shrubs or herbs with alternate, petiolate leaves, often with scales or stellate hairs: male and female flowers distinct not united in heads. Flowers usually monœcious, in terminal spike-like racemes. Female flowers at base of the spike. Calyx pentapartite. Petals in the male flowers 5, alternating with calyx segments. Stamens numerous. Ovary 2-4, generally 3-celled. Capsule separating into 3 two-valved cocci 34

3. **Phyllanthus**, *Linn.* Trees, shrubs or herbs. Leaves stipulate, distichous, entire, short-petioled. Flowers monœcious or diœcious in axillary, lateral clusters. Calyx 5-6 cleft; segments without appendages. Stamens 2–15, generally 3, filaments free or connate. Ovary 2-15 celled, generally 3-celled. Fruit dehiscent, dry or fleshy... 35

CIV. **MENISPERMACEÆ**,—*MENISPERMADS. Climbing, or twining, rarely sarmentose shrubs. Leaves alternate, entire or lobed, usually palminerved. Stipules none. Flowers small, diœcious or polygamous, solitary, fascicled, cymose or racemed, sometimes 3-bracteolate. Sepals 6, free, imbricate in 2-4 series; outer often minute. Male flowers: stamens hypogynous, 6, usually one opposite each petal; filaments free or connate; anthers 2–4 celled, frequently extrorse. Female flowers: stami-*

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nodes 6 or none. Carpels free, distinct, 3 (rarely 1, or 6–12), style terminal, simple or divided. Ovules solitary. Ripe carpels drupaceous. Seed usually hooked or reniform, often curved round an intrusion of the endocarp 37

1. **Tinospora,** *Miers.* Climbing shrubs. Flowers in axillary, or terminal racemes. Sepals 6, bi-seriate. Petals 6, smaller. Male flowers: stamens 6, filaments free. Female flowers: staminodes 6, clavate ovaries 3, stigmas forked. Drupes 1–3 with scar of style near the apex 37

2. **Cocculus,** *DC.* Climbing or sarmentose shrubs, rarely erect. Flowers panicled. Male flowers: sepals 6, bi-seriate; petals 6, smaller, usually auricled, embracing the stamens. Anthers terminal, subglobose. Female flowers: staminodes 6, or none. Carpels 3. Drupes circular, compressed laterally; endocarp horse-shoe shaped tuberculate. 38

3. **Stephania,** *Lour.* Climbing shrubs. Leaves usually peltate; flowers in axillary, cymose umbels. Male flowers: sepals 6–10, free; petals 3–5, obovate, fleshy. Anthers 6, connate. Female flowers: sepals 3–5: staminodes none. Ovary 1. Style 3–6 partite. Drupe glabrous; endocarp horse-shoe shaped, compressed 39

CV. **CUCURBITACEÆ,**—*CUCURBITS.—Climbing herbs or shrubs. Stem brittle; tendrils solitary, lateral, spiral, simple or divided. Leaves usually palmated, or with palmate ribs, succulent, covered with asperities, alternate, petioled, frequently cordate. Flowers white, red or yellow; monœcious or diœcious, racemed and solitary. Calyx 5-dentate; corolla 5-partite, scarcely distinguishable from the calyx. Stamens usually 3 (sometimes 5 or 2); anthers free or united into a tube. Ovary inferior, 1-celled, with 3 parietal placentæ. Fruit more or less succulent, crowned by the scar of the calyx. Seeds many, flat, ovate, enveloped in a skin; testa coriaceous; embryo flat, cotyledons foliaceous, veined* 39

1. **Citrullus,** *Schrader.* Tendrils 2–3-fid. Leaves petioled, palmately 3–7 lobed. Flowers monœcious, all solitary, large. Male; calyx tube campanulate, lobes 5; stamens 3. Anthers connate, 1-celled, two 2-celled, cells conduplicate. Female; calyx and corolla as in the male, ovary ovoid, style short; stigmas 3, reniform. Seeds many 41

2. **Cucumis,** *Linn.* Tendrils simple. Leaves as in citrullus, dentate or serrate. Flowers yellow, monœcious. Males clustered in the axils. Female flowers solitary, short peduncled 41

3. **Coccinia,** *Linn.* Corolla campanulate, divided nearly halfway down. Tendrils simple, flowers white 41

4. **Zehneria,** *Endl.* Tendrils simple. Leaves long or short-petioled, dentate, angular or deeply lobed, polymorphous. Flowers small, yellowish, monœcious or diœcious. Male flowers corymbose, or subumbellate or racemed. Fruit succulent, indehiscent, globose, ellipsoid or cylindric. Seeds many or few, smooth or tubercular ... 42

5. **Æchmandra,** *Arn.* Prostrate herbs, scabrid, or subtomentose. Tendrils simple. Leaves petioled, roundish cordate, somewhat thick, entire, lobed or palmate. Flowers small, monœcious. Male flowers subumbellate, corymbose. Fruit circumciss near the base 42

CXV. **MORINGACEÆ,**—*MORINGADS.—Soft-wooded trees, with alternate odd pinnate, or 2–3 pinnate leaves. Leaflets entire, caducous, opposite, glandular at the base Flowers large, bisexual, irregular white or red, in axillary panicles. Calyx cup-shaped, 5-cleft. Petals 5. Segments unequal; the upper one ascending. Stamens inserted on the edge of the disk, 5 perfect opposite the petals, alternating with 5 or 7 fila-*

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ments without anthers. Ovary stipitate, lanceolate, 1-celled with 3 parietal placentæ, and a simple slender, tubular style. Ovules numerous. Capsule pod-shaped, rostrate 3–6 angled; torulose 1-celled, 3-valved with numerous seeds, half embedded in the fungous substance of the valves. Seeds with a straight embryo without albumen 44

1. **Moringa,** *Juss.* The only genus; characters those of the order 44

CXVI. **VIOLACEÆ,**—*VIOLETWORTS.—Herbaceous plants or shrubs. Leaves simple, alternate, sometimes opposite, entire or pinnatisect, stipulate with an involute vernation. Inflorescence various. Sepals 5, persistent, equal or unequal, with an imbricate æstivation. Petals 5, hypogynous, equal or unequal, with an obliquely convolute æstivation. Stamens 5, alternate; filaments short, broad. Anthers 2-celled, free or connate. Ovary 1-celled, sessile; style simple. Stigma capitate, truncate or cupular. Ovules anatropal. Fruit a 3-valved capsule. Seeds small, albumen fleshy* 45

1. **Viola,** *Linn.* Flowers on 1 rarely 2-flowered peduncles. Sepals produced at base. Petals erect or spreading; lower largest. Anthers connate. Style clavate or truncate. Seeds ovoid, globose 45

CXVII. **FRANKENIACEÆ,**—*FRANKENIADS or SEA HEATHS.—Herbaceous plants or undershrubs; annual or perennial. Stems much branched. Leaves opposite, exstipulate, with a membraneous sheathing base. Flowers pink, small, sessile in the divisions of the branches and terminal, hermaphrodite. Sepals 4–5 united in a furrowed tube, persistent. Petals alternate with the sepals, hypogynous, unguiculate. Stamens 4 or more, hypogynous. Anthers versatile, 2-celled. Ovary free, sessile. Style filiform, 1-celled, slender; stigmas 2–5 lobed. Capsule 1-celled, enclosed in the calyx, 2–4 valved, many-seeded* ... 45

1. **Frankenia,** *Linn.* (Characters those of the order) 45

CXVIII. **TAMARICACEÆ,**—*TAMARISKS. Shrubs or herbs with rod-like branches. Leaves opposite, exstipulate, minute, often scale-like, rarely sheathing. Flowers solitary or in spiked or panicled racemes. Calyx 4–5 partite, persistent. Petals inserted into the base of the calyx; stamens hypogynous, free or connate below. Anthers turned inwards, 2-celled, opening longitudinally. Ovary superior; styles 3; ovules numerous, ascending, anatropal. Capsule 3-valved. Seeds erect or ascending, albumen floury or none. Embryo straight with an inferior radicle* 46

1. **Tamarix,** *Linn.* Bushes or small trees. Leaves scale-like, amplexicaul. Flowers in lateral or terminal spikes, white or pink. Stamens 4, 5, 8, or 10. Styles 3–4, short. Seeds with a sessile plume. 46

CXXIII. **BRASSICACEÆ.**—*CRUCIFERS.—Herbaceous plants, annual, biennial or perennial, seldom suffructicose. Leaves alternate. Flowers racemed, usually yellow or white, seldom purple. Sepals 4, deciduous, imbricate or valvate. Petals 4, hypogynous, cruciate, alternate with the sepals Stamens 6, of which 2 outer are shorter and opposite the lateral sepals, and 4 inner longer, in opposite pairs. Ovary superior, unilocular, with parietal placentæ usually meeting in the middle and forming a spurious dissepiment. Stigmas 2 opposite the placentæ. Fruit a silique, 2 celled or 2-valved pod, many seeded. Seeds small, attached in a single row to each side of the placentæ. Albumen none. Embryo with the radicle folded upon the cotyledons* 47

1. **Notocoras,** *Br.* Pods short, valves with horns or appendages, septate within 49

2. **Farsetia,** *Desv.* Under-shrubs, perennial. Sepals erect, connivent, lateral saccate at base. Petals with long claws. Pods sessile, 2-celled, many seeded. Seeds 1-seriate, compressed, often winged ... 49

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3. **Malcolmia,** *Br.* Leaves entire or pinnatifid. Flowers in lax racemes, white or purple. Sepals equal at base. Petals linear with long claws. Pods terete, rigid. Stigma lobes erect, free or connate in a cone. Seeds 2-seriate.... 50

4. **Sisymbrium,** *Linn* Annuals or biennials, hairy, tomentose, hoary. Leaves pinnatifid or pinnatisect. Flowers yellow, white or rose. Sepals erect, spreading, pod many-seeded. Valves 1-3 nerved, seeds usually 1-seriate 50

5 **Moricandia,** *DC.* Glaucous, branched herbs. Leaves entire, amplexicaul or pinnatisect. Flowers violet, purple or rose. Sepals erect, lateral saccate at base. Petals clawed. Pods linear, elongate or subcylindric. Seeds 1–2–seriate 50

6. **Isatis,** *Linn.* Annuals or biennials with petioled radical leaves. Flowers small, yellow, in terminal racemes. Sepals equal at base, spreading. Petals equal, entire. Pods short, indehiscent, 1-celled, oblong or linear; wing thick. Seeds solitary, pendulous; cotyledon incumbent... 50

CXXIV. **RESEDACEÆ,**—*WELDWORTS.—Herbaceous plants with alternate, entire or pinnately divided leaves and minute, glandular stipules. Flowers in racemes or spikes. Calyx persistent, 4–7 partite. Petals 2–7 hypogynous, having lacerated appendages at the back. Disc conspicuous, hypogynous, 1-sided, glandular. Stamens definite, seated on the disc, filaments erect. Ovary sessile, 3-lobed, 1-celled, many seeded, usually with 3–6 parietal placentæ. Stigmas 3. Ovules amphi- or campylotropal. Fruit capsular, open at top, or berried...* 51

1. **Reseda,** *Linn.* Herbs. Leaves pinnatifid, stipules glandular. Petals 4–7, clawed, multifid, stamens 10–10. Ovary sessile or stalked, syncarpous. Placentæ 3. Capsule many-sided, open at the top 51

2. **Ochradenus,** *Delile.* Small shrubs. Leaves small, linear. Flowers spiked or racemed, calyx, 5-partite. Petals none. Disk unilateral. Stamens 10–20. Ovary ovoid, closed at the top 51

CXXV. **CAPPARIDACEÆ,**—*CAPPARIDS —Herbaceous plants, shrubs, or trees. Leaves alternate, stalked, undivided or palmate Stipules 2 or 0, sometimes spinescent. Flowers solitary or racemose. Sepals 4, free or connate, valvate or imbricate. Petals 4, hypogynous, Stamens 4 or more, hypogynous or perigynous, seldom tetradynamous, disk 0 or tumid or lining the calyx tube. Ovary stalked or sessile, 1-celled with 2 or more parietal placentæ. Ovules amphi- or campylotropal. Style short or 0. Fruit capsular, dehiscent or baccate. Seeds angled or reniform, exalbuminous...* 51

1. **Cleome,** *Linn* Herbs. Leaves simple or digitate, 3-9 foliolate; flowers in racemes yellow, rose, or purple. Sepals 4, spreading. Petals 4, ascending or regular. Stamens 4–8. Ovary sessile, style short or 0 Siliques dehiscent, oblong or linear, one-celled, 2-valved .. 51

2. **Gynandropsis,** *DC* Annual. Leaves 5-foliolate, long-petioled. Flowers in racemes Sepals 4, spreading. Stamens 6. Silique elongate, stalked, 2-valved 52

3. **Cratæva,** *Linn.* Trees Leaves trifoliolate; flowers large, yellow or purple. Sepals and petals inserted on a hemispherical disc. Sepals 4 Petals 4, long-clawed, open in bud. Stamens indefinite; filaments slender, filiform, free. Ovary on a long gynophore with 2 placentas bearing numerous ovules. Berry fleshy Seeds embedded in pulp... 53

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4. **Cadaba,** *Forsk.* Shrubs. Leaves trifoliolate, flowers solitary, corymbose, or in racemes. Sepals 4, unequal, 2-seriate, 2 outer valvate. Petals 2, 4, rarely 0, hypogynous, clawed. Stamens 4–6 on a slender gynophore, filaments filiform, spreading. Ovary long-stalked, 1-celled. Fruit fleshy, slender, cylindric, 2-valved 53

5. **Capparis,** *Linn.* Spinescent shrubs, rarely trees, erect; decumbent or climbing; leaves simple. Flowers, with rare exceptions, bi-sexual, white or colored. Sepals 4, rarely 3 or 5, free, connate. Petals 4, sessile, imbricate. Stamens indefinite, hypogynous, inserted at the base of the long gynophore. Ovary stalked, 1–4 celled. Stigma sessile. Ovules indefinite on 2–6 parietal placentas. Fruit syncarpous, more or less fleshy 53

6. **Strœmeria,** *Vahl* Shrub. Corolla 4-petalled or 0. Calyx 4-leaved. Ovary 1-celled. Berry pedicelled, many-seeded 55

CXXVII. **BYTTNERIACEÆ,**—*BYTTNERIADS.—Trees, shrubs or undershrubs, more or less pubescent. Leaves alternate, simple, veined. Flowers in racemes or panicles. Calyx membranous, 4–5 lobed. Stamens hypogynous Ovary free, sessile or stalked* 56

1. **Melhania,** *Forsk.* Undershrubs. Leaves simple, downy. Peduncles axillary, 1-flowered. Flowers yellow. Sepals 5, connate below. Petals 5. Stamens 10; filaments 5 alternating with as many staminodes. Ovary 5-celled, sessile. Style 5. Capsule 5-valved ... 56

CXXX **MALVACEÆ,**—*MALLOW-WORTS, Lind.—Herbs, shrubs or trees, with a soft light wood. Young parts mostly covered with more or less dense stellate hairs. Leaves alternate, stipulate, palminerved, simple or lobed. Flowers axillary or terminal, regular, hermaphrodite or 1-sexual, generally bisexual. Sepals 5, connate, valvate in bud. Petals 5, hypogynous, twisted and imbricate in bud. Stamens indefinite, monadelphous. Ovary syncarpous. Carpels numerous whorled round a central axis. Fruit either a dehiscent or indehiscent cocci. Seeds reniform, solitary, few or numerous, glabrous, hairy, silky or woolly* ... 57

1. **Althæa,** *Linn* Herbs erect or decumbent, pubescent. Leaves more or less deeply lobed. Flowers axillary, solitary or fascicled, peduncled. Bracteoles 6–9. Calyx double. Ovary many-celled; styles filiform. Ovules solitary, ascending; 1 in each cell. Carpels numerous. 57

2. **Malva,** *Linn.* Pubescent herbs. Leaves lobed. Flowers axillary. Bracteoles 3. Sepals 5. Petals emarginate. Ovary many-celled. Stigmas linear, as many as carpels. Carpels numerous 57

3. **Sida,** *Linn.* Herbs. Leaves simple or lobed. Bracteoles 0. Sepals 5, valvate. Petals 5. Carpels 5 or more. Stigmas terminal ... 58

4. **Abutilon,** *Gærtn.* Pubescent herbs. Leaves, lobed or angled. Flowers axillary or terminal. Bracteoles 0. Sepal 5. Petals 5 Styles as many as carpels... 59

4. **Malachra,** *Linn.* Herbs. Leaves angled. Flowers axillary or terminal in dense heads. Sepals 5. Petals 5. Staminal tube truncate or 5-toothed. Carpels 5, 1-ovuled, 1-seeded. Styles 10 60

5. **Urena,** *Linn.* Herbs, covered with rough pubescence. Leaves angled or lobed. Flowers clustered. Bracteoles 5. Sepals 5. Petals 5, tomentose, or slightly so. Carpels pubescent or echinate 61

6. **Pavonia,** *Cav.* Herbs or undershrubs. Leaves entire, angular or lobed, more or less pubescent. Flowers axillary or terminal. Bracteoles 5. Sepals 5. Petals 5. Ovary 5-celled. Carpels indehiscent, 2-valved. 61

6. **Senra,** *Cav.* Undershrub. Leaves orbicular, 3-lobed. Flowers axillary. Bracteoles 3, large, membranous, free. Sepals 5. Petals 5. Ovary 5-celled. Styles 5. Capsule 5-valved. 62

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7. **Hibiscus,** *Medik.* Herbs, shrubs or trees. Leaves stipulate. Flowers axillary. Bracteoles 5 or more, or 0. Sepals 5, valvate. Petals 5. Ovary 5-celled. Capsule 5-valved. Seeds glabrous, hairy or woolly 62

8. **Gossypium,** *Linn.* Herb, shrub or small trees. Leaves palmately lobed. Flowers axillary, peduncled. Bracteoles 3, large, cordate, sprinkled like the calyx with black glandular dots. Sepals 5. Petals spreading, convolute. Ovary 5-celled 64

CXXXI. **TILIACEÆ,**—*LINDENBLOOMS.—Trees, shrubs or herbs. Leaves simple or lobed, stipulate, toothed, alternate, rarely opposite. Flowers axillary, cymose, large, regular, hermaphrodite or unisexual. Sepals 4–5, distinct or united with a valvate æstivation. Petals 4–5, imbricate or valvate. Stamens numerous, rarely definite, hypogynous, free, sometimes 5, adelphous. Ovary single, 2–10 celled. Style 1, columnar or divided. Ovules attached to the inner angle of the cells of the ovary. Fruit fleshy, or dry, often prickly. Seeds 1 or many, ascending, pendulous; testa leathery, crustaceous or pilose* 64

1. **Corchorus,** *Linn.* Herbs or undershrubs covered with stellate hairs. Leaves simple. Flowers small, yellow. Sepals 4–5, glandless. Petals 4–5. Ovary 2–6 celled. Style short. Fruit elongate, slender or sub-globose 65

2. **Triumfetta,** *Linn.* Herbs or undershrubs, more or less covered with stellate pubescence. Leaves serrate or lobed. Flowers yellowish, in dense cymes. Sepals 5. Petals 5. Stamens 5–35. Ovary 2–5 celled. Style filiform. Fruit globose or oblong, echinate, indehiscent or 3–6 valved 65

3. **Grewia,** *Linn.* Trees or shrubs more or less pubescent with stellate hairs. Leaves entire, 1–9 nerved. Flowers axillary. Sepals distinct. Petals glandular. Ovary 2–4 celled. Style subulate. Drupe fleshy or fibrous, entire or 2–4 lobed 65

CXXXIII. **POLYGALACEÆ,**—*MILKWORTS.—Shrubs or herbaceous plants, annuals or perennials. Leaves alternate, or whorled, simple, entire, without stipules. Pedicels axillary, solitary, 1-flowered. Flowers large, irregular, 2-sexual, 3-bracteate. Sepals 4–5, unequal, deciduous or persistent, with a valvate æstivation. Petals 5 or 3, unequal, distinct. Stamens hypogynous, distinct, 8–10; anthers 2–4 celled, opening by terminal pores. Ovary free, 1–3 celled. Style generally curved, 1 or 2. Fruit capsular, 2-celled, 2-valved; dehiscence loculicidal. Seed pendulous, ovate, strophiolate, albuminous. Embryo cylindrical* 66

1. **Polygala,** *Linn.* Herbs; rarely shrubs. Leaves alternate; sepals persistent. Petals 3. Stamens 8. Anthers opening by terminal pores. Ovary 2-celled. Ovules 1 in each cell. Capsule 2-celled, loculicidal, 2-seeded 66

CXXXVI. **SAPINDACEÆ,**—*SOAPWORTS.—Trees or shrubs; seldom twining. Leaves alternate, stipulate or exstipulate, pinnate, trifoliolate, palmate or simple, often marked with lines or pellucid dots. Flowers in racemes, mostly polygamo-diœcious, small, white, or pink, seldom yellow* 67

1. **Dodonæa,** *Linn.* Shrubs. Leaves alternate, exstipulate. Flowers polygamous, inconspicuous. Sepals 5-2 imbricated or valvate; petals wanting. Stamens usually 8. Capsule 2–6 sided, membranous or coriaceous. Seeds exalbuminous 67

2. **Cardiospermum,** *Linn.* Climbing herbs. Leaves alternate, exstipulate. Leaflets bi-ternate, dentate; racemes axillary, lowest pair

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of pedicels developed into spiral tendrils. Sepals 4, concave; 2 outer ones small. Petals 4, in pairs. Stamens 8, eccentric; filaments free or connate at base. Ovary 3-celled. Capsule 3-celled, 3-valved, loculicidal. Valves membranous. Seeds globose, exalbuminous; testa crustaceous... 68

CXXXIX. **MALPHIGIACEÆ,**—*MALPHIGIADS.—Climbing or sub-erect shrubs or trees. Leaves usually opposite or whorled, entire, coriaceous, generally stalked, glandular; stipules generally short and deciduous, occasionally larger and intra-petiolar. Racemes terminal or axillary, simple or compound. Peduncles erect, bracteate, articulate with the 2 bracteolate pedicels. Calyx 5-partite with conspicuous glands. Petals 5, unguiculate, silky. Stamens 10, all fertile. Carpels generally 3. Fruit various; a woody nut, drupe or samaroid. Seed exalbuminous. Embryo straight or curved* 68

1. **Hiptage,** *Gærtn.* Leaves opposite, entire, coriaceous. Stipules 0. Racemes terminal or axillary, simple or compound. Flowers white, fragrant. Calyx 5-partite with a large oblong gland outside. Petals 5, unguiculate, silky. Stamens 10, declinate, all antheriferous, one longer than the rest. Ovary 3-lobed. Style 1, filiform. Fruit 1–3. Samaras connate at the base and terminating in long wings 68

CXLVII. **REAUMURIACEÆ,**—*REAUMURIADS.—Small shrubs with fleshy scale-like leaves which are alternate, have no stipules, and are overspread by resinous sunk glands. Calyx 5-partite, surrounded by imbricated bracts. Petals 5, hypogynous, unequal-sided with sometimes a pair of membranous plates planted upon their middle. Stamens definite or indefinite, hypogynous, monadelphous or polyadelphous. Carpels free, 2–4–5. Fruit capsular, 2–5 valved. Seeds shaggy* 70

1. **Reaumuria,** *Haselq.* Leaves alternate, narrow. Stipules 0. Calyx 5-partite. Petals 5, hypogynous. Flowers lilac. Fruit capsular... 70

CXLVIII. **NYMPHÆACEÆ,**—*WATERBEANS or WATERLILIES.—Aquatic herbs with peltate, floating, fleshy leaves, margins involute in vernation. Scapes 1-flowered, naked Sepals 3–5. Petals 3–5 or many. Carpels 3 or more in one whorl free or connate or irregularly sunk in the pits of the disk. Fruit of connate or separate dehiscing carpels. Albumen floury or 0* 7

1. **Nymphæa,** *Linn.* Large herbs; rootstock creeping. Flowers expanded, large, floating on radical scapes. Sepals 4–6. Petals and stamens indefinite, inserted on the disk, which is confluent with the carpels. Fruit a spongy berry ripening under water. Seeds minute, buried in pulp in a sac-like fleshy aril 70

2. **Nelumbium,** *Juss.* Aquatic herbs with milky juice. Rootstock creeping. Leaves peltate, raised above the water. Flowers rose-red, white, or yellow. Sepals 4-5, caducous. Petals and stamens indefinite, hypogynous, caducous. Ovaries many, 1-celled. Ovules 1–2-pendulous. Carpels ovoid, loose in the pits of the spongy torus... 71

CLIV. **RANUNCULACEÆ,**—*CROWFOOTS.—Annual or perennial herbs, rarely shrubs. Leaves alternate or opposite, generally much divided, with the petiole dilated and forming a sheath, almost clasping the stem. Stipules rarely free. Flowers usually conspicuous, regular or irregular, 1-2 sexual, rarely bracteate. Sepals 3–6, hypogynous, deciduous, imbricate, valvate or duplicate. Petals 0, or 3–5 or more, hypogynous, in one or more rows. Stamens hypogynous; anthers adnate. Carpels numerous, 1-celled; stigma simple. Ovules anatropal. Fruit of numerous 1-seeded achenes or follicular, with one or two valves. Seeds albuminous. Embryo minute* 72

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1. **Ranunculus**, *Linn* Annual or perennial herbs. Leaves entire, lobed or divided. Stipules membranous or 0. Flowers panicled, white or yellow. Sepals 3–5, caducous. Petals usually 5, rarely 0, often glandular. Stamens many. Carpels many. Ovule 1 ascending. Fruit a spike of apiculate achenes. Seed erect 73

2. **Dolphinium**, *Linn* Annual or perennial herbs. Leaves palmately lobed. Flowers irregular racemed or panicled, white, blue or purple. Sepals 5, free, dorsal spurred behind. Petals 2–4 small. Fruit many-seeded follicles 73

CLVI. **PAPAVERACEÆ,**—*POPPYWORTS. Herbaceous plants or shrubs often with a milky juice. Leaves radical or alternate. Stipules* 0. *Peduncles long,* 1-*flowered*; *flowers regular, hermaphrodite. Sepals* 2, *deciduous. Petals hypogynous,* 4, 2-*seriate, usually crumpled before expansion, occasionally* 0. *Stamens many, hypogynous. Anthers* 2-*celled, innate. Ovary* 1-*celled with parietal placentæ. Fruit* 1-*celled, podshaped or capsular with several placentæ. Seeds numerous. Embryo minute,* 2-*fid or* 2-*lobed* 75

1. **Argemone**, *Linn.* An erect prickly annual; milky juice yellow. Flowers yellow Sepals 2–3. Petals 4-6. Ovary 1-celled. Style short, 4–7 lobed. Ovules many on 4–7 parietal placentas ... 76

CLVIII. **FUMARIACEÆ,**—*FUMEWORTS.—Herbaceous plants with brittle stems and watery juice. Leaves pinnatisect; flowers yellow, white or purple. Sepals* 2, *deciduous. Petals* 4, *cruciate, irregular. Stamens* 4, *hypogynous, free. Ovary* 1-*celled, free. Capsule slender, capsular. Albumen fleshy. Embryo minute* 77

1. **Hypecoum**, *Tournf.* Leaves pinnatisect. Flowers yellow, white, or purple. Stamens distinct. Ovary 1-celled septate within..... 77

CLXXI. **AMYRIDACEÆ,**—*AMYRIDS. Trees or shrubs, abounding in balsam or resin. Leaves alternate or opposite, ternate or unequally pinnate, stipulate or exstipulate. Flowers axillary or terminal, racemed or panicled, regular, small. Calyx persistent, free* 3-6 *lobed. Petals* 3-6 *distinct, æstivation valvate, sometimes imbricate. Stamens all fertile; twice as many as petals. Fruit hard, dry, drupaceous, containing* 2–5 *pyrenes. Seeds solitary, without albumen* 77

1. **Balsamodendron**, *Kunth.* Balsamiferous, often spiny trees. Leaves alternate 1–5 foliolate. Leaflets sessile, crenate or serrate Flowers small, polygamous on short-petioles or sessile. Calyx tubular, 3–4 toothed, persistent. Petals 3–4. Stamens 6–8, usually 4 long and 4 short Ovary with more cells than one 81

CLXXIII. **MELIACEÆ,**—*MELIADS.—Trees or shrubs with alternate, generally pinnate leaves, without stipules. Flowers regular, small, bisexual, sometimes imperfect by abortion. Calyx small,* 4–5 *cleft. Petals generally* 4–5, *free, rarely connate; stamens twice as many as the petals. Disc annular, cupshaped or tubular. Ovary free,* 3–5 *celled. Style* 1. *Ovules* 2 *in each cell or numerous. Fruit berried, drupaceous or capsular. Seed with or without albumen* 84

1. **Melia**, *Linn.* Trees with alternate, pinnate, or tripinnate leaves. Flowers white or purple in large panicles. Calyx 5–6 cleft. Petals 5–6. Stamens monadelphous. Ovary 3–6 celled. Fruit a fleshy drupe, albumen scanty or none 85

CLXXX **ZYGOPHYLLACEÆ,**—*BEAN-CAPERS.—Herbs or shrubs with articulate branches, and opposite or alternate stipulate* 2–3 *foliolate or pinnate leaves. Stipules twin, persistent, and sometimes spiny. Flowers solitary, in pairs, or threes, white, blue, yellow, or red; hermaphro-*

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dite, regular or irregular. Sepals 5, free or rarely connate at the base, imbricate, rarely valvate. Petals unguiculate, alternate with the segments of the calyx. Stamens twice as many as petals, dilated at the base. Anthers versatile. Ovary simple, surrounded at the base with glands. Fruit capsular, with 4 or 5 angles or wings. Seeds pendulous, solitary, rarely twin or more. Embryo green, radicle superior. Albumen in small quantity 90

1. **Tribulus,** *Linn* Branching prostrate herbs. Leaves stipulate, opposite, unequal, abruptly pinnate. Flowers solitary, on axillary peduncles, white or yellow Sepals 5, deciduous. Petals 5, spreading, fugacious. Disk annular 10-lobed; filaments filiform, naked. Ovary sessile, hirsute, 5–12 celled. Style short. Fruit 5-angled, 5–12 spinous tuberculate or spinous cocci 91

2. **Seetzenia,** *Br.* Leaves 3-foliolate; leaflets obovate, apiculate. Peduncles axillary, 1-flowered. Flowers small. Sepals 5. Petals 0. Stamens 5. Fruit ovoid of 5, 1-seeded cocci 91

3. **Peganum,** *Linn.* Leaves alternate, entire, or multifid; stipules setaceous Flowers white, in subterminal, leaf-opposed peduncles. Sepals 4–5, persistent, foliaceous. Petals 4–5, subequal, imbricate. Stamens 12–15, some antherless. Anthers linear. Ovary globose, 2–3 lobed. Ovules many in each cell. Fruit globose, 3–4 celled, dry, 3-valved or fleshy and indehiscent. Embryo curved ... 91

3. **Fagonia,** *Linn.* Leaves opposite, 1–3 foliolate, entire, mucronate; stipules spiny. Peduncles solitary. Sepals 5, deciduous. Petals 5, caducous. Disk short. Stamens 10; filaments filiform, naked. Ovary sessile 5-cornered, 5-celled. Fruit 5-cornered of 5, 1-seeded cocci... 91

4. **Zygophyllum,** *Linn.* Leaves opposite, 1–2 foliolate, fleshy. Stipules 2, often spiny. Peduncles 1–2 flowered. Flowers white or yellow, spotted red or purple. Calyx 4–5 partite. Petals 4–5, unguiculate, imbricate and contorted. Ovary sessile, 4–5 cornered. Fruit capsular, 4–5 cornered, winged, loculicidally 5-valved. Seed 1 or many in each cell 92

CLXXXI. **ELATINACEÆ.**—*WATERPEPPERS.—Minute annuals growing in marshy places. Leaves opposite or whorled, entire or serrate, with stipules between the petioles. Flowers small, axillary. Sepals and petals 3–5, imbricated, distinct, or slightly connate at base. Stamens hypogynous, usually twice as numerous as the petals, free. Ovary free; 3–5 cells. Stigmas capitate Ovules many, anatropal. Fruit capsular, 3–5 celled. Capsules septicidal; valves flat at the edge, or rolled inwards, separating from the axis and septa. Seed straight or curved. Embryo cylindric, straight or curved* 93

1. **Elatine,** *Linn.* Aquatic herbs with opposite or whorled leaves. Flowers small, axillary. Sepals 2-4 membranous, obtuse. Petals 2-4. Ovary sub-globose. Capsule membranous; Septa evanescent after bursting or adhering to the axis. Seed cylindric, straight or curved, ridged and pitted 93

2. **Bergia,** *Linn.* Erect or decumbent pubescent annuals, with opposite, serrate, or sometimes entire leaves. Flowers solitary in axillary fascicles, minute, 5-merous. Capsule sub-crustaceous, septicidal ... 93

CXCI. **POLYGONACEÆ,**—*BUCKWHEATS.—Herbs or shrubs with alternate, simple, stipulate leaves. Stipules usually sheathing the stem. Flowers small, hermaphrodite or unisexual. Perianth herbaceous or colored, 3–6 lobed or leaved. Stamens perigynous, usually 6–10. Ovary free, compressed or trigonous. Seed albuminous...* 96

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1. **Calligonum,** *Linn.* Shrubs, nearly leafless. Flowers hermaphrodite Perianth 5-partite. Stamens 10 or more. Styles 4. Stigmas capitate. Nuts subtetragonous, closely set with setæ 99

2. **Rumex,** *Linn.* Annuals with alternate, or opposite, petioled leaves. Flowers hermaphrodite. Valves toothed, grained, or naked... 99

CXCII. **NYCTAGINACEÆ,**—*NYCTAGOS.—Annuals or perennials with fusiform, fleshy roots, or shrubs or trees, usually articulated at the tumid nodes. Leaves opposite or alternate. Flowers axillary or terminal, clustered or solitary, sometimes imperfect, having an involucre, which is either common or proper in one or several pieces. Calyx tubular, contracted in the middle, its limb entire or toothed. Stamens definite, hypogynous; anthers 2-celled. Ovary superior, with a single erect ovule. Style 1 terminal; Stigma 1. Fruit a thin utricle, enclosed within the persistent base of the calyx. Seed without its proper integuments, testa incoherent with the utricle. Embryo with foliaceous cotyledons; radicle inferior* ... 99

1. **Boerhaavia,** *Schreb.* Shrubs. Leaves cordate, covered with silvery pubescence underneath. Flowers terminal in peduncled heads. Calyx inferior, gibbous, permanent Germ one-celled. Ovule single, erect. Corolla campanulate inserted on the calyx. Seed solitary. Embryo with inferior radicle 100

CXCIII. **PHYTOLACCACEÆ,** — *PHYTOLACCADS.—Undershrubs or herbaceous plants. Leaves alternate entire, exstipulate, often with pellucid dots. Flowers racemose, perfect, regular or irregular. Calyx of 4–5 imbricated leaves, persistent. Stamens hypogynous, indefinite. Anthers 2-celled opening lengthwise. Carpels solitary, or several, each containing 1 ascending ovule which is either amphi- or campylotropal. Styles and Stigmas as many as the carpels. Fruit baccate or dry, indehiscent. Seeds ascending, solitary* 102

1. **Limeum,** *Linn.* Branched, prostrate herbs; glandular or glabrous. Leaves alternate. Stipules 0. Flowers bracteate, in cymes, hermaphrodite, or unisexual. Sepals 5, nearly free, ovate, herbaceous; Petals 3–5, small. Stamens 5–10, hypogynous. Ovary globose, 2-celled. Stigmas 2, short. Ovule 1 in each cell, basal 102

2. **Suriana,** *Linn.* Under Simarubeæ in Hk. Fl. Br. Ind.; Wight and Arnott's Surianaceæ in *Prods.* I. 360, referred to by Lindley, under Phytolaccads. (Veg Kingd. 509.) A littoral shrub, the only species of the genus. Leaves simple, entire. Flowers hermaphrodite, conspicuous. Calyx 5-partite, persistent. Petals 5, imbricate. Disk inconspicuous. Fruit of 5 or fewer carpels, covered by the persistent Calyx, each one-seeded, indehiscent 103

CXCIV. **AMARANTACEÆ,**—*AMARANTHS.—Herbs or shrubs with simple, opposite or alternate exstipulate leaves. Flowers in heads, generally hermaphrodite. Sepals 3–5, hypogynous, scarious, persistent, herbaceous or colored, distinct or united at the base. Stamens hypogynous, 5 opposite the sepals or a multiple of that number, distinct or monadelphous, occasionally abortive. Anthers 2-celled or 1-celled. Ovary single, free, 1 or few seeded. Fruit a membranous utricle or berry. Seeds lentiform, pendulous. Albumen central, farinaceous* ... 100

1. **Celosia,** *Linn.* Erect annuals or perennials. Leaves opposite or alternate. Calyx 5-leaved. Corol none. Ovary 1-celled. Ovules several. Capsules opening transversely and containing more seeds than one. Embryo with a central perisperm 100

2. **Ærua,** *Forsk.* Annual, erect, ramous, woolly. Leaves alternate, orbicular. Spikes crowded Nectary 10-partite, antheriferous. Stigmas 2-cleft. Capsule utricular, one-seeded. 101

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3. **Achyranthes,** *Linn.* Annuals or biennials Leaves opposite, downy. Spikes long 101

4. **Alternanthera,** *Forsk.* Herbs, growing in the vicinity of marshes. Leaves opposite, obovate, petioled. Flowers inconspicuous in dense sessile, axillary spikes. Perianth 3-bracteate. Sepals 5, equal. Styles short, sub-cylindric Stigma papillose, utriculus membranous, cellulose. Seed sub-compressed. Embryo arcuate; albumen farinaceous 102

5. **Desmochæta,** *Linn.* Decumbent, pubescent herbs. Leaves opposite, short-petioled. Spikes terminal. Flowers greenish, binate or ternate, 3-bracteate. Sepals 5, sub-equal. Style 1, filiform. Stigma papillose, utriculus membranaceous, 1-seeded. Seed ellipsoid ... 102

6. **Digera,** *Forsk.* Ramous, decumbent herb with subterete, flexuose stems. Leaves alternate. Perianth 3-bracteate, biseriate. Ovary 1-locul, 1-ovulat. Ovule pendulous. Style filiform. Stigma bifid, utriculus verrucose. Testa membranaceous. Albumen farinaceous. Cotyledon oblong-lanceolate 102

7. **Amaranthus,** *Linn.* Herbs or shrubs, erect, spreading or prostrate. Leaves alternate or opposite. Calyx 3–5 leaved. Corol none. Styles 3. Capsule membranaceous, 1-celled, 1-sided, opening horizontally. Embryo annular, with a perisperm 103

CXCV. **CHENOPODIACEÆ,**—*GOOSEFOOTS.—Herbaceous plants or undershrubs, sometimes jointed. Leaves alternate, or opposite, exstipulate. Flowers small. Calyx deeply cleft, sometimes tubular at base, with an imbricate æstivation. Stamens as many as or fewer than the segments of the calyx, inserted into the base. Ovary single Style in 2 or 4 divisions, rarely simple. Stigmas undivided. Fruit membranous, sometimes baccate. Embryo annular, surrounding the albumen, or in a flat spiral, with the radicle in various directions* 103

1. **Chenopodium,** *Linn.* Calyx 5-partite. Corol none. Seed solitary, covered with a thin membrane, and embraced by the persistent calyx 103

2. **Salsola,** *Linn.* Calyx 5-leaved. Corol none. Capsules one-seeded. Seed screw-shaped 104

3. **Salicornia.** *Tournf* Calyx gibbous. Corol none. Seed one ... 105

CXCIX. **BASELLACEÆ,**—*BASELLADS.—Climbing, herbaceous or shrubby plants, usually somewhat succulent, with alternate, exstipulate leaves. Flowers naked, sessile or stalked. Sepals in two rows, fleshy, hardly opening. Stamens opposite the sepals, inserted into their sides. Anthers 2-celled. Ovary free, 1-celled. Styles several. Fruit membranous. Embryo annular or coiled up spirally with albumen in the centre or separated into two superficial masses* 106

1. **Basella,** *Linn.* Herbaceous plants. Calyx seven-cleft, with the two opposite divisions broader. Anthers opening outwards longitudinally 106

CC. **MESEMBRYACEÆ,**—*FICOIDS.—Shrubby or herbaceous succulent plants with opposite or whorled, simple, often fleshy leaves; Stipules 0 or scarious. Flowers in terminal cymes or clusters, rarely solitary, regular, hermaphrodite. Sepals definite, usually 5; but varying from 4 to 8. Petals usually wanting, when present, small. Stamens indefinite, distinct, perigynous or hypogynous; Staminodes sometimes present. Ovary free (except in Mesembryanthemum).—2–5 celled, syncarpous. Stigmas numerous, distinct. Styles as many as the carpels. Fruit capsular. Capsule surrounded by the fleshy calyx. Seeds many or 1 in each carpel. Embryo curved. Albumen farinaceous* 106

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1. **Glinus**, *Linn.* Prostrate herbs. Leaves whorled or alternate. Flowers axillary, sessile or pedicelled in cymes or racemes. Bracts inconspicuous. Sepals 5, persistent. Petals and staminodes 0. Stamens 5–3, rarely many. Ovary free. Styles 3–5. Capsule membranous, surrounded by the sepals, 3–5 celled 106

2. **Gisekia**, *Linn.* Branched herbs. Leaves opposite or falsely whorled, fleshy, spathulate; Stipules 0. Flowers hermaphrodite, or polygamous, sessile and pedicelled, small, greenish or purplish, in axillary cymes. Sepals 5. Petals 0. Stamens 5, hypogynous. Carpels 5–3, distinct, each containing one basal ovule. Fruit of 5 free carpels.. 107

3. **Orygia**, *Forsk.* Herb. Leaves opposite and alternate, fleshy, entire. Stipules 0. Flowers in terminal, lax cymes. Stamens 12 or more, sub-hypogynous. Ovary free, 5-ribbed, 5-celled; Styles 5, filiform. Ovules many. Capsule globose, papery, sheathed by the persistent calyx. Seeds many, reniform, strophiolate 107

CCI. **TETRAGONIACEÆ,**—*AIZOONS.—Succulent-leaved, herbaceous plants, or small shrubs with alternate, often pustular, exstipulate leaves and small axillary flowers. Calyx 3–5 cleft. Corol 0. Stamens definite, alternate with the sepals. Ovary 2–9 celled. Styles as many as the cells of the ovary, distinct. Fruit an indehiscent tough-shelled nut or a capsule splitting all around* 107

1. **Trianthema**, *Linn.* Prostrate, branched herbs, glabrous or papillose. Leaves opposite, petioled, unequal, linear to obovate, entire. Stipules 0. Flowers sessile or peduncled in axillary cymes or clusters. Calyx 5-sepalled; sepals united at the base. Petals wanting; stamens 5–10 or more, inserted on the tube of the calyx. Ovary obovate, 1–2 celled. Ovules attached to filiform podosperms. Styles 1–2, simple. Capsule membranous, truncated, 1–2 celled, clavate, circumciss. Seeds reniform 107

2. **Sesuvium**, *Linn.* Fleshy, herbaceous plants, with opposite exstipulate leaves. Flowers axillary, sessile or peduncled. Calyx 5-partite, persistent, colored inside. Petals 0. Stamens many or 5, inserted into the bottom of the calyx. Ovary free, sessile. Styles 3–5. Capsule 3, rarely 4–5 celled, membranous. Embryo annular... 108

3. **Aizoon**, *Linn.* Procumbent herbs with alternate or falsely opposite, entire, exstipulate leaves. Calyx lobes 5-4, spreading, yellow within. Petals wanting. Stamens many, inserted near the top of the calyx-tube. Ovary free, 5–4 celled. Capsule surrounded by the persistent calyx, 5-celled. Seeds 2 or several in each cell ... 109

CCIX. **FABACEÆ,**—*LEGUMINOUS PLANTS.—Trees, shrubs or herbaceous plants with alternate, usually trifoliate or pinnate, digitate or simple leaves. Stipules at the base of the petiole and at the base of each leaflet; pedicels generally articulated. Flowers usually irregular, hermaphrodite, rarely regular or polygamous. Calyx 5-partite, toothed or cleft with the odd segment anterior. Segments often unequal and variously combined. Petals 5, or less by abortion, or wanting, inserted into the base of the calyx, usually unequal. Stamens definite or indefinite, normally 10, perigynous, or hypogynous, distinct, monadelphous or diadelphous. Anthers 2-celled, versatile, dehiscence almost always longitudinal. Ovary 1-celled, free. Style and stigma simple. Fruit usually dry, a legume or a drupe. Seeds usually exalbuminous, occasionally with an aril. Cotyledons foliaceous or amygdaloid* 112

1. **Crotalaria**, *Linn.* Herbs or shrubs with simple or 3-foliolate, very rarely odd-pinnate leaves. Flowers yellow in terminal racemes. Calyx 5-lobed, somewhat 2-lipped; the upper lip 2, the lower 3-cleft;

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vexillum large, cordate; keel falcate. Stamens monadelphous; anthers dimorphous. Ovary sessile or stipitate, linear, usually multi, rarely 2-ovulate. Legume sessile or stipitate, linear or oblong, turgid, many-seeded. Seeds compressed, reniform 112

2. **Lotononis,** *DC.* Calyx-tube narrow, turbinate; lowest tooth deeper than the other 4. Corolla little exserted. Stamens united in a tube slit along the top; anthers dimorphous. Ovary sessile, linear. Style abruptly incurved at the base. Stigma minute, oblique. Pods linear, usually compressed 112

3. **Trigonella,** *Linn.* Herbs, annuals. Leaves pinnately 3-foliolate, toothed. Flowers racemed, lemon yellow. Calyx-tube campanulate, teeth distinct, sub-equal. Petals free. Standard and wings narrow. Stamens diadelphous. Pod linear, compressed, many-seeded 113

4. **Medicago,** *Linn.* Herbs, rarely shrubs. Leaves pinnately 3-foliolate; leaflets toothed. Calyx tube campanulate; teeth 5, sub-equal. Stamens diadelphous; anthers uniform. Ovary sessile, usually many-ovuled. Style short; stigma oblique. Pod usually spirally twisted, many-seeded, indehiscent 113

5. **Ononis,** *Linn.* Viscid herbs. Leaves with pinnately 3-foliolate toothed leaflets. Calyx-tube campanulate. Petals clawed. Stamens monadelphous; anthers dimorphous. Ovary sub-sessile, few ovuled. Pod oblong, turgid 114

6. **Indigofora,** *Linn.* Silvery. canescentor densely pubescent herbs or shrubs with pinnate or digitate leaves. Flowers in axillary racemes. Calyx-tube campanulate; teeth 5, sub-equal. Stamens diadelphous; anthers uniform, apiculate. Ovary sessile. Pod turgid, linear, cylindrical or oblong, 1 or more seeded 114

7. **Tephrosia,** *Linn.* Herbs with usually odd-pinnate leaves and opposite sub-coriaceous leaflets. Flowers in terminal. axillary, or leaf-opposed racemes. Calyx-tube campanulate. Petals clawed. Stamens diadelphous. Ovary sessile, linear, many-ovuled. Style incurved, filiform. Stigma capitate. Legume generally sessile and flat, linear, many-seeded. Seeds compressed 117

8. **Caragana,** *Lam.* Low shrubs with the leaf rachises and stipules usually spinescent and hardened, persistent from year to year. Calyx campanulate, 5-toothed, deltoid or lanceolate. Stamens diadelphous. Anthers uniform, obtuse. Ovary linear, sessile, many-ovuled. Stigma minute, terminal. Pod linear, turgid 118

9. **Astragalus,** *Linn.* Herbs or under-shrubs. Leaves pinnate; leaf rachis, terminating either in a leaflet or spine. Calyx tubular or campanulate, 5-toothed. Stamens diadelphous. Anthers uniform. Ovary sessile or stalked, many-ovuled. Style incurved; stigma capitate. Pod linear or oblong, usually turgid 118

10. **Æschynomene,** *Linn.* Herbs or under-shrubs with close, sensitive, odd pinnate linear leaflets. Calyx deeply 2-lipped, the lips faintly toothed. Corolla fugacious. Stamens in two bundles of 5 each. Anthers uniform. Ovary stalked, many-ovuled. Style filiform, incurved; stigma terminal. Pod linear, longer than the calyx... ... 122

11. **Alhagi,** *Desv.* Low shrub with simple leaves, axillary flowers and 5-toothed campanulate calyx. Stamens diadelphous. Anthers uniform. Ovary linear, sessile, 6–8 ovulate. Pod linear or moniliform. 123

12. **Taverniera,** *DC.* Under-shrubs with simple or 3-foliolate leaves. Flowers in lax racemes. Calyx-tube turbinate; teeth 5, distinct. Stamens monadelphous. Anthers uniform. Ovary stalked, 2–4 ovulate. Pod of 1–4, flattened, muricated joints 123

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13 **Hedysarum,** *Linn* Herbs with odd pinnate, exstipulate leaves Calyx-tube campanulate or tubular; teeth 5. Stamens diadelphous. Anthers uniform. Ovary linear, stalked, few-ovuled. Pod of 1-3 flattened joints 123

14 **Canavalia,** *DC.* Twining perennials with stipellate,. 3-foliolate leaves. Calyx deep, the limb 2-lipped. Ovary stalked, many-ovuled. Pod large, linear, oblong, ribbed on each valve 124

15. **Rhynchosia,** *Lour.* Twining or erect shrubs. Leaves pinnately 3-foliolate; gland dotted beneath. Stipules and bracts caducous. Calyx-tube short. Stamens diadelphous. Anthers uniform. Ovary sessile, 2-ovuled. Pod round or oblong, flattish or turgid 127

16. **Dalbergia,** *Linn. fil.* Trees or climbing shrubs with alternate subcoriaceous, unequally pinnated leaves. Calyx campanulate. Corolla papillionaceous. Stamens monadelphous or diadelphous. Pod membranaceous. 1–4 seeded... 129

17. **Parkinsonia,** *Linn.* A low bush or tree, Leaves with 2–6 pinnæ from a very short rachis. Flowers yellow. Calyx deeply cleft. Stamens 10; anthers versatile. Ovary short-stalked, many-ovuled. Pod turgid, dry, moniliform 129

18. **Guilandina,** *Linn.* Trees or shrubs with hooked prickles. Leaves abruptly pinnated; bracts elongated. Calyx deeply cleft. Sepals 5. Petals 5 Stamens 10, free, declinate. Legume ovate, compressed, covered with straight prickles. Seeds bony, shining, nearly globose ... 129

19. **Cassia,** *Linn.* Trees, shrubs or herbaceous plants with simple, abruptly pinnate leaves. Flowers in axillary racemes and terminal panicles. Calyx-tube short. Stamens normally 10, but rarely all perfect. Ovary sessile or stalked, many-ovuled. Pod variable, several-seeded. 130

20. **Pongamia,** *Vent.* Arborescent or fruticose. Leaves odd pinnate. Calyx campanulate. Ovary sub-sessile, 2-ovuled. Legume woody, flattened, oblong, with a short recurved point 134

20. **Tamarindus,** *Linn.* Tree with abruptly pinnate leaves. Calyx-tube turbinate. Stamens monadelphous, only 3-developed. Ovary many-ovuled. Pod ligulate, more or less curved, with a thin crustaceous epicarp and thick pulpy mesocarp 134

21. **Prosopis,** *Linn.* Erect trees or shrubs copiously covered with prickles. Leaves bipinnate with small narrow leaflets. Calyx minute, campanulate, faintly 5-toothed. Petals 5, ligulate. Stamens 10. Ovary stalked, many-ovuled. Pod turgid, cylindrical or oblong with a spongy mesocarp 136

22. **Mimosa,** *Linn.* Usually low shrubs, with or without prickles. Leaves conjugately, digitately or doubly pinnated. Leaflets small, sensitive, ligulate, caducous. Flowers capitate, polygamous. Stamens twice the number of petals. Ovary stalked, many-ovuled. Style filiform. Pod flat, membranous, of 1 or more 1-seeded joints 136

23. **Acacia,** *Willd.* Spinose or prickly shrubs or trees. Leaves bi-pinnate; leaflets minute. Flowers in globose or cylindrical spikes, hermaphrodite, or polygamous, usually pentamerous. Calyx campanulate, shortly 4–5 toothed. Stamens free. Ovary stalked or sessile, many-ovuled. Pod ligulate or oblong, dry, dehiscent, or indehiscent, 2 valved. Seeds without pulp 137

24. **Albizzia,** *Durazz.* Large trees with flowers in the Indian species, in globose heads or spikes, generally hermaphrodite. Calyx campanulate, distinctly toothed. Ovary sessile or shortly stalked. Pod large, thin, flat, strap-shaped. Seed attached by a filiform thread..... 140

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CCXIII. **ROSACEÆ,**—*ROSEWORTS.—Herbaceous plants or shrubs with simple or compound, alternate leaves, often with 2 stipules at their base. Flowers variously arranged, usually bisexual and regular Calyx 4 or 5 lobed, free or adnate to the ovary Petals 5, perigynous, equal or 0. Stamens perigynous, definite or indefinite arising from the calyx within the petals. Ovary of one or more free or connate carpels, with free or connate styles. Stigmas simple, penicellate or capitate. Fruit 1-seeded nuts, achenes, berries, or drupes, rarely capsular. Seeds pendulous. Embryo straight* 142

1. **Rosa,** *Linn.* Erect, scrambling or climbing shrubs more or less prickly. Leaves pinnate, alternate, with leafy stipules adhering to the petiole. Flowers terminal, solitary or corymbose, white, yellow, or red. Calyx-tube persistent, contracted at the mouth; lobes leafy, imbricate in bud. Petals 5. Stamens many. Anthers 2-celled. Carpels several, 1-seeded, hairy 142

2. **Neurada,** *Linn.* Herbaceous annual, covered with a woolly tomentum Flowers axillary, solitary. Calyx-tube flat, dilated at length, conic, spiny and forming an orbicular disk. Stamens 10. Carpels 10 in a whorl. Styles subulate, spinescent. Fruit a depressed cone with spinous margins 142

3. **Potentilla,** *Linn.* Perennial herbs. Leaves compound. Stipules adnate to the petiole. Flowers white or yellow; calyx persistent, 4–5 cleft, with 4–5 bracteoles. Petals 4-5. Achenia numerous ... 143

CCXVIII. **LYTHRACEÆ,**—*LOOSESTRIFES.—Herbs, shrubs or trees. Branches usually quadrangular. Leaves opposite or alternate, entire, ex-stipulate. Flowers hermaphrodite, regular, rarely oblique. Calyx-tube free, persistent, lobed.; lobes 3–6, valvate. Petals alternate with the lobes of the calyx, deciduous—sometimes 0. Stamens definite or many, inserted on the calyx tube. Ovary free, 2-6 celled. Style long; stigma capitate, rarely 2-lobed. Ovules numerous. Capsule membranous, surrounded by the calyx. 6 celled, or by imperfection 1-celled* 143

1. **Ammania,** *Linn* Herbaceous annuals, growing in damp places. Stems quadrangular. Leaves opposite and alternate, entire. Flowers axillary, sessile, or shortly peduncled. Bracteoles usually 2. Calyx campanulate, 3–5 or more toothed. Petals 4–5 or 0. Stamens 2-8, inserted on the calyx tube. Ovary 2–4-celled. Style short or elongate, Stigma capitate. Capsule ovate-globose, membranaceous, enclosed in the calyx, 2–3 valved or irregularly bursting. Seeds numerous 143

2. **Lawsonia,** *Linn.* Erect, glabrous shrubs. Leaves opposite, entire, lanceolate. Flowers in terminal panicles. Bracts small, deciduous. Calyx-tube very short, lobes 4, ovate. Petals 4, obovate. Stamens usually 8. Ovary sessile, 4-celled. Capsule globose, membranaceous, irregularly breaking up Seeds numerous 144

3. **Grislea, (Woodfordia),** *Salisb.* Leaves opposite, subsessile, entire, lanceolate; flowers scarlet on axillary peduncles in short panicled cymes. Pedicels, 2-bracteate at their base. Calyx tubular, with 4–6 erect teeth and as many smaller horn-shaped sinuses. Petals 6, small or 0. Stamens 12, declinate. Ovary sessile, 2-celled. Style filiform, protruded. Stigma 2-cleft. Capsule 2-celled, 2-valved, included in the calyx. Seeds very numerous 144

CCXXII. **RHAMNACEÆ,**—*RHAMNADS.—Trees or shrubs often spinous. Leaves alternate with small stipules. Calyx 4-5 cleft, valvate. Petals distinct or 0. Stamens definite opposite the petals. Ovary free, sessile adherent to the calyx-tube, 2-4 celled. Ovules solitary Fruit fleshy, and indehiscent or dry and separating in 3 divisions. Seeds erect, albumen fleshy* 146

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1. **Zizyphus,** *Juss.* Shrubs or trees, frequently armed with sharp, straight or hooked prickles. Leaves alternate, sub-bifarious, 3-nerved, cymes axillary. Calyx patent, 5-cleft. Petals unguiculate, 5, rarely 0. Stamens 5, exserted; disk pentagonal. Ovary 2-3 celled, immersed; Styles 2-3. Fruit fleshy or dry, with a woody or bony 1-4 seeded, 1-4 celled stone 146

CCXXXV. **OROBANCHACEÆ,**—*BROOMRAPES.—Herbaceous leafless plants parasitic upon the roots of other species. Stems covered with brown or colorless scales. Calyx divided, persistent, inferior. Corolla monopetalous, hypogynous, irregular, persistent, with an imbricated æstivation. Stamens 4, didynamous. Anthers occasionally 1-celled, but more generally 2-celled; the cells distinct, mucronate or bearded at the base. Ovary superior, 1-celled Style 1. Stigma 2-lobed. Fruit capsular, enclosed within the withered corolla. Seeds indefinite, very minute* ... 152

Phelipæa, *Desf.* 152

CCXXXVIII. **SOLANACEÆ,**—*NIGHTSHADES.—Herbaceous, plants and shrubs. Leaves alternate, undivided or lobed. Sometimes collateral; floral ones sometimes double. Inflorescence variable. Pedicels without bracts. Calyx 4–5 partite, persistent, inferior; corolla monopetalous, hypogynous, deciduous, limb 5-cleft, seldom 4-cleft. Stamens inserted on the corolla Anthers bursting longitudinally. Ovary 2-celled, rarely 4–5 or many-celled, with polyspermous placentæ. Style continuous. Stigma simple. Ovules numerous, amphitropal; pericarp with 2, or 4, or many cells, either a capsule with double dissepiment parallel with valves or a berry with the placentæ adhering to the dissepiment. Seeds numerous...* ... 154

1. **Datura,** *Linn.* Annual or perennial herbs; fœtid and poisonous. Leaves petioled, oblong or ovate, often angularly toothed. Flowers axillary, solitary, large, white, carmine or violet. Calyx tubular, often angled, 5-cleft. Corolla funnel-shaped, limb spreading, plicate, 5-toothed. Stamens inserted on the tube of the corolla. Ovary incompletely 4-celled. Style simple Stigma bi-lamellate. Capsules ovate or subglobose, muricated or prickly. Half-four celled, incompletely 4-valved at the divisions. Seeds many, reniform ... 155

2. **Physalis,** *Linn.* Annual or perennial herbs. Leaves alternate or twin, entire or lobed. Flowers solitary, axillary. Calyx 5-cleft or 5-toothed, inflated like a bladder. Corolla rotate-campanulate, plicate. Stamens included; filaments free, filiform. Anthers erect. Ovary 2-celled, many-ovuled Style simple. Stigma capitate. Berry covered by a connivent inflated calyx, globose, 2-celled. Seeds many, reniform, compressed 157

3. **Solanum,** *Linn.* Annual or perennial herbs, undershrubs, shrubs or trees; glabrous or hairy, unarmed or prickly. Leaves alternate, solitary or twin or in threes. Cymes simple or dichotomous. Flowers hermaphrodite, rarely polygamous, often barren with an abortive pistil. Calyx 5-partite, cleft, toothed, or crenated. Stamens 5, rarely 4 or 6. Ovary 2, rarely 3-4, celled, many-ovuled. Style simple, stigma obtuse. Berry 2-celled. Seeds many, reniform 158

4 **Lycium,** *Linn.* Calyx urceolate, regularly 5-toothed or irregularly 3-5 cleft, permanent corolla funnel-shaped or tubular; limb 5 or 10 cleft, imbricate in æstivation, sometimes plicate. Stamens 5, usually exserted. Stigma capitate, bisulcate. Berry roundish, 2-celled, supported by the persistent calyx. Placentas adnate. Seeds numerous, reniform 159

5 **Puneeria,** *Stocks.* Calyx campanulate, 5-cleft; segments subulate, inflated after flowering. Corolla campanulate, or somewhat

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rotate, longer than the calyx, 5-cleft; stamens inserted on the tube of the corolla, included. Ovary ovate-globose, glabrous, many-ovuled. Style simple; stigma capitate. Berry globose, 2-celled, enclosed in the calyx. Seeds many, reniform 157

CCXXXIX. **ASCLEPIADACEÆ,**—*ASCLEPIADS.—Twining or erect shrubs with milky juice, or herbaceous, or succulent perennials with watery juice. Leaves entire, opposite, sometimes alternate or whorled, having ciliæ between their petioles instead of stipules. Flowers somewhat umbelled, fascicled, or racemose proceeding from between the petioles. Calyx 5-cleft, persistent. Corolla monopetalous, hypogynous, 5-lobed, regular; æstivation subvalvate, deciduous. Stamens 5, inserted into the base of the corolla, alternate with its lobes. Filaments usually connate. Anthers 2-celled or incompletely 4-celled. Ovaries 2. Styles 2, closely approaching each other. Stigma common to both styles, dilated, with corpusculiferous angles. Fruit follicular; follicles 2, or 1 by abortion; placentæ attached to the suture. Seeds numerous, imbricated, pendulous, almost always comose at the hilum* 159

1. **Periploca,** *Linn.* Twining undershrub; corolla rotate, 5 partite. Staminal corona tubular, plicate, 5 crenate. Stigma flat, 2-lobed; follicles slender, smooth reflexed. Seeds comose 159

2. **Calotropis,** *R. Br.* Erect milky shrubs. Leaves opposite; umbels intra-petiolar. Corolla campanulate, tube angled, limb 5-parted. Staminal corona 5-leaved, leaflets keel-shaped. Anthers terminated by a membrane. Pollen masses compressed, pendulous. Stigma mutic; follicles ventricose, smooth. Seeds comose 160

3. **Sarcostemma,** *R. Br.* Twining or decumbent shrubs. Stems leafless, jointed or with opposite distant leaves. Umbels lateral or terminal. Corolla rotate. Staminal corona double. Anthers terminated by a membrane. Pollen masses affixed by the apex, pendulous. Stigma apiculate or mutic; follicles slender, smooth. Seeds comose... 161

4. **Oxystelma,** *R. Br.* Twining undershrubs, corolla sub-rotate, spreading, with a short tube. Staminal corona 5-leaved, leaflets acute. Other characters as in *Sarcostemma* 161

5. **Dæmia,** *R. Br.* Staminal corona, double, 10-partite. Segments alternate, dwarf; inner, 5-leaved; follicles ramentaceous, other characters as in *Sarcostemma* 161

6. **Ceropegia,** *Linn.* Herbs or undershrubs, often twining. Calyx 5-partite, corolla more or less ventricose from the base, funnel-shaped; Gymnostegium included. Staminal corona gamophyllous, 5-10-15 lobed in a single or double series; lobes ligulate. Anthers simple at the apex. Stigma mutic; follicles cylindraceous, smooth; seeds comose... 162

7. **Orthanthera,** *R. Br.* Corolla urceolate, 5-cleft, throat naked, tube subventricose. Staminal corona 0. Anthers simple at the apex, erect, acute. Pollen masses erect, affixed by the base. Apex narowed, pellucid. Stigma apiculated 162

8. **Leptadenia,** *R. Br.* Corolla sub-rotate, tube short, scales of the throat 5, alternating with the segments. Staminal corona 0. Anthers free, simple at the apex, follicles smooth. Seeds comose. Other characters as in *Orthanthera.* The only species of this genus is *L. Jacquemontiana,* a much-branched erect shrub with slender twiggy branches and narrow linear leaves on the younger branches only. Umbels few-flowered, short peduncled. Segments of corolla keeled, glabrous. Scales fleshy, depressed. Flowers subsessile, small, yellow 162

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CCXL. **CORDIACEÆ,**—*SEBESTENS.—Trees. Leaves alternate, scabrous, without stipules. Flowers panicled, with minute bracts. Calyx inferior, 4-5 toothed, ribbed in most cases. Corolla monopetalous, 4–5 cleft, regular, imbricated Stamens alternate with the segments of the corolla. Anthers versatile. Ovary superior, 4–8 celled, with 1 pendulous anatropal ovule in each cell. Style continuous; stigma 4–8 cleft with recurved segments. Fruit drupaceous, 4–8 celled. Seeds pendulous from the apex of the cells by a long funiculus. Albumen* 0 162

1. **Cordia,** *Plum.* Trees or shrubs. Flowers in racemes, spikes or panicles Calyx tubular, 4–5 toothed. Corolla campanulate or funnel-shaped with a flat 5–7 cleft limb and a hairy or naked throat. Stamens 5, short, inserted in the throat of the corolla. Style protruding, bifid, with 4 stigmas. Ovary 3-4 celled. Drupe containing 1 stone with 1 or 3 cells, two of which are usually abortive 162

CCXLI **CONVOLVULACEÆ,**—*BINDWEEDS.—Herbs or undershrubs with straight, procumbent or twining stems and alternate, simple, entire or lobed, sessile or petioled leaves. Flowers bell-shaped, one or several in axillary peduncles forming cymes, racemes or umbels; pedicels often bi-bracteate, calyx 5-sepaled. Sepals persistent, corolla monopetalous or hypogynous with a plaited æstivation. Stamens* 5. *Ovary usually simple,* 2–4 *celled, rarely partially or altogether,* 1–*celled. Style* 1, *entire, stigma acute, flattened. Fruit capsular,* 1–4 *celled, cells* 1–2 *seeded. Albumen mucilaginous* 164

1. **Convolvulus,** *Linn* Herbs or undershrubs. Sepals 5. Corolla campanulate. Style 1. Stigmas 2, linear, cylindric, often revolute. Ovary 2-celled, 4-ovuled. Capsule 2-celled 164

2. **Rivea,** *Choisy.* Twining, suffructicose. Sepals 5. Corolla showy, tubular or funnel-shaped. Style 1. Stigma capitate or lamelliform, 2-lobed. Ovary 4-celled, 4-ovuled. Capsule baccate 165

3. **Lettsomia,** *Roxb.* Climbers, with tomentose stems. Sepals 5; corolla campanulate. Style 1. Stigma capitate, 2 lobed; ovary 2-celled, 4-seeded. Fruit baccate, surrounded by the sepals, often rubescent 165

4. **Pharbitis,** *Choisy* Twining herbs. Sepals 5. Corolla campanulate. Style 1. Stigma capitately granulate. Ovary 3, rarely 4-celled; cells 2-seeded 166

CCXLII. **CUSCUTACEÆ,**—*DODDERS.—Leafless climbing, colorless parasites Flowers in dense clusters. Calyx inferior, persistent,* 4-5 *partite, with an imbricate æstivation. Corolla persistent, the limb regular.* 4-5 *cleft. Scales alternating with the segments of the corolla. Stamens equal to the segments and alternate with them. Anthers* 2-*celled. Ovary* 2-*celled. Ovules twin. Styles* 2 *or* 0. *Stigmas* 2. *Fruit capsular or baccate,* 2-*celled. Cells* 1–2 *seeded* 166

Cuscuta, *Tourn.* Calyx 5 cleft; corolla tubular. Ovary free, 2-celled, 4-ovuled. Styles rarely combined into 1. Stigmas acute, clavate or capitate. Fruit capsular 166

CCXLV. **PLUMBAGINACEÆ,**—*LEADWORTS.—Herbaceous plants or undershrubs. Leaves alternate or clustered, undivided, exstipulate, sometimes marked with transparent dots. Flowers in panicles or heads. Calyx tubular, persistent, plaited. Corolla of a very thin texture, of* 5 *petals, which have a long narrow claw. Stamens definite opposite the petals, hypogynous in the monopetalous species. Ovary superior composed of* 5 *or* 3-4 *valvate carpels. Ovule anatropal. Styles and stigmas* 5 *Fruit a nearly indehiscent utricle* 167

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1. **Statice,** *Linn.* Herbs. Flowers in spikes, corolla 5-partite. Calyx scarious above. Capsule not bursting 168

CCXLVI. **PLANTAGINACEÆ,**—*RIBWORTS.—Herbaceous or suffructescent plants. Calyx imbricated in æstivation, 4-partite. Corolla monopetalous, hypogymous. Stamens 4, filaments filiform Ovary simple, superior, 1-celled, terminating by a simple linear stigma. Capsule membranous. Seeds many, sessile...* 168

1. **Plantago,** *Linn.* Flowers hermaphrodite. Calyx 4-leaved, Corolla 4-lobed, scarious. Stamens 4. Anthers cordate. Ovary 2-4 celled; cells 1-8 ovuled. Capsule membranaceous, bursting transversely. 168

CCXLVIII **MYRSINACEÆ,**—*ARDISIADS.—Trees or shrubs with alternate, simple, entire or toothed, exstipulate leaves. Flowers small usually pentamerous or tetramerous in axillary clusters or panicles. Calyx free, 5-partite. Corolla regular, gamopetalous. Stamens epi-petalous as many as petals and opposite to them. Ovary 1-celled, ovules numerous or few. Fruit an indehiscent berry or drupe, rarely splitting lengthwise. Seeds with few exceptions albuminous* 168

1. **Ægiceras,** *Gærtn.* Shrubs inhabiting salt marshes near the sea. Leaves entire, coriaceous. Flowers small. Calyx 5 lobed. Fruit elongate, falcate. Other characters as that of the order 169

2. **Reptonia,** *A. DC.* Evergreen shrubs with entire subcoriaceous leaves and small flowers. Calyx 5-lobed. Corolla with a short tube, and 5-spreading lobes, convolute in the bud, with 5 small scales, alternating with the lobes and inserted in the mouth of the tube. Ovary superior, 1 celled. Ovules 1-4. Drupe globose. Seed albuminous 169

CCL. **SALVADORACEÆ,**—*SALVADORADS.—Trees or shrubs with opposite, petioled, entire leaves with minute stipules. Flowers small, regular tetramerous in loose paniculate spikes or racemes. Calyx inferior, 4-lobed, minute. Corolla membranous, monopetalous, 4-partite. Stamens 4, filaments short, inserted at the base of the corolla. Anthers round, 2-celled, bursting lengthwise. Ovary superior, 1-celled, with a single sessile stigma. Seeds 1-4, albumen none* 170

1. **Salvadora,** *Linn.* Leaves subcoriaceous, main lateral nerves anastomising by intra-marginal veins. Flowers bisexual in the axils of deciduous bracts. Fruit a 1-seeded berry supported by the persistent calyx... 170

CCLI. **EHRETIACEÆ,**—*EHRETIADS.—Trees or shrubs with harsh pubescence. Leaves simple, alternate, exstipulate. Flowers gyrate. Calyx inferior, 5-partite, imbricated in æstivation. Corolla monopetalous, tubular. Stamens alternate with the segments of the corolla, and equal to them in number. Ovary 2 or more celled. Style terminal, stigma simple, 2-lobed. Ovules suspended. Fruit drupaceous. Seed solitary* 170

1. **Coldenia,** *Linn.* Calyx 5, rarely 4-partite. Corolla infundibuliform. Germ superior, 1-seeded, nuts four, 1-celled. Seeds with fleshy albumen. Embryo inverse. Cotyledons conduplicate... 170

2. **Heliotropium,** *Linn.* Villous herbs or undershrubs. Calyx 5-partite, persistent. Corolla salver-shaped, throat contracted into vaults, sometimes bearded. Style short; stigma subconical. Nuts 1-celled. Seeds exalbuminous 171

3. **Ehretia,** *Linn.* Trees or shrubs, often glabrous. Leaves alternate. Flowers in terminal or axillary cymes, with small bracts. Calyx 5-lobed, persistent. Corolla cup-shaped, lobes imbricated.

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Stamens generally exserted. Ovary 2-celled, with 2 ovules in each cell, or 4-celled, 1 ovule in each. Style terminal, bifid. Stigmas capitellate. Fruit a drupe. Albumen scanty 171

CCLIII. **BORAGINACEÆ,**—*BORAGEWORTS.—Herbaceous plants or shrubs. Stems round. Leaves alternate, often covered with asperities consisting of hairs proceeding from an indurated enlarged base. Flowers in 1-sided gyrate spikes or racemes, or panicles. Calyx free, persistent, 4-5 lobed, valvate in bud. Corolla hypogynous, monopetalous, generally regular, 5-cleft with an imbricated æstivation. Stamens as many as the corolla lobes. Ovary 4-partite, 4-seeded, 2 celled with 1 or 2 ovules in each cell. Style simple, 2-4 fid. Fruit a drupe or dry nut. Seed separable from the pericarp* 172

1. **Trichodesma,** *L.* Herbs; sometimes suffrutescent. Leaves alternate or opposite, sessile, entire; pedicels lateral, hispid, arranged in racemes. Calyx 5-partite, corolla tube broad, cylindric. Ovary 4-celled. Style filiform, simple. Nuts 4–1. Seed obovoid, exalbuminous 172

2. **Arnebia,** *DC.* Calyx 5-partite, corolla infundibuliform. Nuts 4, truncate 173

CCLVI. **VERBENACEÆ,**—*VERBENES.—Trees, shrubs or herbaceous plants. Leaves generally opposite, simple or compound, exstipulate. Flowers in opposite corymbs, or spiked alternately, sometimes in dense heads, seldom axillary and solitary. Calyx persistent, gamosepalous. Corolla hypogynous, gamopetalous, tubular, 4-5 lobed, imbricate in bud. Stamens usually 4, didynamous, seldom equal. Ovary 2 or 4 celled, ovules erect or ascending, anatropal or amphitropal, solitary or twin. Style 1; stigma 1. Fruit dry or fleshy, indehiscent or separating into 2-4 segments, nuts or pyrenes. Seeds few, exalbuminous* 174

1. **Clerodendron,** *Linn.* Shrubs or small trees, rarely herbs. Leaves simple, opposite or in whorls. Calyx 5-lobed. Corolla tube slender, limb spreading; lobes 5, unequal. Ovary 4-celled. Fruit a drupe almost dry. Albumen none 174

2. **Lantana,** *Linn.* Shrubs. Leaves opposite or verticelled, simple or feather nerved. Peduncles axillary. Flowers in bracteate heads or spikes. Calyx membranaceous, small, ciliate; corolla infundibuliform. Style terminal, short; stigma linear; drupe fleshy or succulent with 2 nuts 174

3. **Vitex,** *L.* Trees or shrubs. Leaves opposite digitate, usually of 3–5 leaflets. Calyx 5-lobed. Corolla-tube short, limb spreading, 5-lobed. Stamens 4, in pairs. Ovary 2–4 celled, 1 ovule in each cell. Style filiform, 2-lobed. Fruit a succulent drupe. Putamen separating into 4 hard, 1-seed pyrenes 175

4. **Lippia,** *L.* Undershurbs. Calyx membranaceous, tubular, 2-keeled. Corolla tubular, sub-infundibuliform. Stamens didynamous, inserted in the tube, enclosed. Anthers 2-celled. Ovary 2-celled; cells 1-ovuled; stigma lateral, linear. Fruit dicoccous, pericarp hard ... 175

5. **Streptium,** *Roxb.* Undershrubs. Calyx 5-partite. Corolla funnel-shaped; tube twisted. Ovary superior, 4-celled. Cells 1-seeded. Nuts enclosed in the persistent calyx. Seed solitary 175

6. **Avicennia,** *Linn.* (Lind. N. O. Myoporaceæ). Calyx 5-partite. Corolla bi-labiate. Upper lip emarginate. Capsule leathery, cordate, 1-seeded 176

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CCLXIV. **SCROPHULARIACEÆ,**—*FIGWORTS*—*Herbs, undershrubs or shrubs. Leaves alternate or opposite, lower ones opposite or whorled. Stipules* 0. *Flowers axillary or racemose, rarely spiked. Peduncles opposite or alternate, sometimes simple, 1-flowered or many-flowered in dichotomous cymes. Bracts* 2. *Flowers hermaphrodite, usually regular. Calyx free, persistent,* 5–4 *merous. Corolla monopetalous, hypogynous, pentamerous; æstivation bi-labiate. Stamens inserted on the corolla, alternate with its lobes. Anthers 2-celled. Ovary 2-celled. Ovules numerous, Fruit capsular; placentæ* 4. *Seeds albuminous* 179

1. **Antirrhinum,** *L.* Corolla personate, gibbous at the base, with no distinct spur, lobes of the upper lip erect; those of the lower spreading, 3-fid with the middle segment smallest and a bearded palate, closing the mouth. Capsule 2-celled. Seeds oblong, minute; testa black 179

2. **Stemodia,** *L.* Herbs. Calyx 5-partite. Segments narrow, upper lip of corolla bi-labiate. Stamens 4, included. Anther cells disjoined, stalked. Style dilated at the apex, often 2-lobed. Capsule globose, ovate or oblong, 2-celled. Seeds numerous 179

3. **Peplidium,** *Del.* Herbs. Calyx tubular, 5-sided, shortly 5-toothed; limb of the corolla 5 cleft; posterior stamens 0; filaments of the anterior ones dilated at the base, appendiculate. Anthers 2-celled. Capsule globose, thinly membranaceous, fragile 179

4 **Linaria,** *Linn.* Herbs. Corolla personate, spurred. Lower lip 3-fid with a prominent palate closing the mouth. Capsule valvular 180

CCLXXIII. **ASTERACEÆ,**—*COMPOSITES.*—*Herbaceous plants or shrubs. Leaves alternate or opposite, exstipulate, usually simple, but commonly much divided. Florets unisexual or hermaphrodite, collected in dense heads. Bracts present or* 0. *Calyx superior, closely adhering to the ovary; the limb either wanting or divided into bristles, paleæ or hairs, and called pappus. Corolla monopetalous, superior, ligulate or funnel-shaped; æstivation valvate. Stamens* 4–5, *alternating with the teeth of the corolla. Ovary inferior, 1-celled, 1-ovuled. Style simple. Stigma* 3, *distinct or united. Fruit a dry pericarp. Seed solitary, erect* 181

1. **Eclipta,** *Linn.* Herbaceous plants with opposite leaves and solitary axillary peduncles. Involucre 2-series, scales 10-12, receptacle flat, covered with paleæ. Capitula many-flowered, heterogamous. Florets of the ray 1-series, female, shortly ligulate; of the disk, tubular, 4-toothed. Achenia of the ray triangular, of the disk tuberculated on the sides 181

2. **Grangea,** *Adans.* Procumbent herbs with sinuately pinnatifid, alternate leaves. Capitules solitary, globose, terminal. Involucre 2-series, receptacle hemispherical. Capitula heterogamous, florets tubular, two or more outer series female, very slender, 3-toothed, centre ones hermaphrodite, 5-toothed. Achenium somewhat compressed with a cup-shaped pappus, rather fimbriate in the margin 182

3. **Xanthium,** *Tournf.* Herbaceous plants with variously divided leaves, heads of flowers irregularly glomerate, spicate, males above, females below. Capitula monocious; male involucre, sub-globose, many flowered. Scales free, 1-series, receptacle paleaceous, corolla clavate, 5-lobed. Anthers free, female 2-flowers, enclosed within a 2-beaked prickly involucel. Corolla filiform. Achenium one in each cell ... 182

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4. **Berthelotia,** *DC.* Shrub with alternate, sessile leaves; capitula forming thick corymbs on the buds of the branches; receptacle naked. Capitula heterogamous, flowers of the circumference, many series, female 2-3 toothed; of the disk few, 5-toothed. Achenium tapering, without a beak; pappus 1-series, paleaceous 183

5. **Leontodon,** *Linn.* Leaves all radical, oblong, entire, sinuate or runcinately-pinnatifid; scapes often 1-headed, piped? Capitula many-flowered, yellow; involucre double, outer scales small. Inner ones, 1-series; receptacle naked. Achenia oblong, striated, spinulose or ribbed; pappus pilose 186

6. **Lactuca,** *Linn.* Herbaceous; head of flowers panicled, involucre cylindrical, calyculately imbricated, 2-4 series; receptacle naked. Capitula few-flowered. Achenia compressed, wingless, terminating in a filiform beak 189

CCLXXIX. **RHIZOPHORACEÆ,**—*MANGROVES.—Trees or shrubs generally glabrous. Leaves simple, opposite, occasionally dotted with convolute deciduous stipules between the petioles. Peduncles axillary or terminal. Flowers generally bisexual, regular. Calyx adherent to the ovary, or free; limb 4-14 toothed, lobes valvate, usually coriaceous and persistent. Petals as many as calyx lobes. Stamens 2–4 times the number of petals. Filaments free. Anthers 2-celled. Ovary 2-5 celled. Ovules mostly germinate, pendulous. Style 1. Stigma simple. Fruit coriaceous, 1-celled, 1-seeded, indehiscent, or 3-4 celled, and septicidally dehiscent* 190

1. **Ceriops,** *Arnott.* Large shrubs. Flowers coriaceous. Calyx-tube short, limb 5–6 partite. Petals 5–6, truncate. Stamens 10-12; filaments filiform. Anthers 2-celled. Ovary 3-celled. Ovules 2 in each cell. Fruit coriaceous, long-exserted, 1-celled, 1-seeded, germination in the fruit on the tree 190

2. **Rhizophora,** *Linn* Trees with stout branchlets marked with annular scars of leaves and deciduous stipules. Stipules elongate. Calyx 4 to many cleft. Corolla 4 to many petalled. Stamens 8-12, perigynous. Ovary half inferior, 2-celled. Ovules germinate, pendulous. Fruit and germination as in *Ceriops* 190

3. **Bruguiera,** *Lam.* Trees with the habit of *Rhizophora.* Flowers coriaceous, solitary or few together, on short axillary recurved peduncles without bracts. Calyx ebracteolate; segments 10-15, linear. Petals as many, 2-lobed. Stamens twice the number of petals. Ovary inferior. Fruit crowned by the persistent calyx. Germination as in *Rhizophora* 191

CCLXXXII. **MYRTACEÆ,**—*MYRTLE-BLOOMS.—Trees or shrubs. Leaves usually opposite, entire, with transparent dots, rarely serrated. Calyx 4–8 cleft. Petals alternating with the sepals, rarely 0; æstivation imbricated. Stamens inserted with the petals, usually definite; filaments distinct, monadelphous, or polyadelphous, curved inwards in æstivation. Anthers 2-celled, bursting longitudinally. Ovary 1–15 celled Style and stigma simple. Placentæ axillary. Fruit dry or fleshy 2–6 or many celled or by abortion 1–celled. Seeds usually indefinite. Albumen none* .. 191

1. **Sonneratia,** *Linn.* Calyx campanulate, 4-6 cleft, cohering with the ovary at the base; lobes acute. Æstivation valvular. Petals 4–6, alternating with the lobes of the calyx or 0. Style filiform. Stigma large, peltate. Fruit baccate, many celled. Seeds numerous, curved, covered with a fleshy pulp. Embryo curved. Cotyledons unequal, leafy, convolute 193

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CCXCIII. **CINCHONACEÆ,**—*CINCHONADS.—Trees or herbaceous plants. Leaves simple, entire, opposite or verticelled, with interpetiolar stipules. Calyx coherent. Sepals as many as petals. Corolla tubular. Stamens springing from the corolla and alternating with the petals. Ovary inferior, 2-celled or occasionally none. Ovules numerous, attached to a central placentæ, or else few and erect. Style occasionally divided. Stigma divided or simple. Fruit indehiscent or dehiscing into 2-cocci, dry or succulent* 194

1. **Oldenlandia,** *L.* Slender, erect, or diffuse herbs. Leaves usually small and narrow. Stipules acute or bristly. Flowers small, white or pink in dichotomous, axillary and terminal panicled cymes. Calyx 4-partite, permanent. Corolla 1-petalled, 4-partite, funnel-shaped. Ovary 2-celled. Style filiform. Stigmas 2, linear. Ovules numerous. Capsule small, usually membranous; seeds angled or globose 195

CCXCVI **APIACEÆ,**—*UMBELLIFERS.—Herbaceous, rarely suffrutescent, plants with fistular and furrowed stems. Leaves alternate, rarely opposite, simple, variously divided, sheathing at the base. Flowers in umbels, usually surrounded by an involucre. Calyx entire or 5-toothed; petals 5, alternate with the teeth of the calyx. Æstivation imbricate, rarely valvate. Stamens 5, alternating with the petals. Ovary 2-celled, one solitary pendulous ovule in each cell. Styles 2. Stigmas simple. Fruit consisting of 2 carpels which adhere by their face, called the carpophore, each carpel with 10 or more ribs. Embryo small.* ... 196

1. **Eryngium,** *Linn.* Spinescent, glabrous, erect perennials. Leaves spinous toothed, entire, lobed, or dissected. Flowers in simple heads, each bracteolate. Calyx, tube covered with scales. Petals white, narrow, erect. Fruit ellipsoid, nearly cylindric; carpels dorsally sub-compressed; primary ridges obtuse, not prominent, secondary 0. Vittæ in the primary ridges inconspicuous or 0, with some scattered in the endocarp. Carpophore 0. Seed semi terete, subcompressed, subconcave in the inner face 196

2. **Psammogeton,** *Linn* Glabrous herbs; margin of calyx obsolete; petals obcordate, with an inflexed point. Styles somewhat erect from a conical base; fruit terete; mericarp with 5 primary filiform ridges bearing glochidiate bristles. Secondary ones bristly in a simple series; interstices under the secondary ridges with single vittæ, commissure flat, with 2 vittæ. Carpophore bipartite, free 201

THE PLANTS (DESCRIBED) AND THE DRUGS OF SIND.

Class I. Thallogens.

ALLIANCE 1. *ALGALES.* THE ALGAL ALLIANCE. Lind.

Algæ, or Seaweeds, are cellular flowerless plants, found both in salt and fresh water, nourished through their whole surface by the medium in which they vegetate; propagated by zoospores, colored spores, or tetraspores; varying in structure through a variety of intermediate gradations, from simple microscopic vesicles, to branched, rather woody plants. They have a wide geographical range; and, to a considerable extent, obey the same laws as land plants; every zone presenting a peculiar system of vegetation. In the manufactures and domestic economy of man they are of no little importance. As manure and fuel, Seaweeds are valued on the British Coast, besides as supplying a quantity of gelatinous matter. *Chondrus crispis*, known as the Carrageen moss of Ireland, supplies a nutritious article of diet; and has of late years been introduced into the British Pharmacopœia as a demulcent, exhibited in the form of decoction or jelly. The Tangles *Laminaria saccharina et digitata*, Dulse, and some species of Porphyria and Ulva, known as the Green and Purple Lavers, are used as food on the British Coast; and nearly all the species of Laminaria, Alaria and Fucus are burnt for kelp, or impure carbonate of soda, and valued also for the iodine they yield. —(*Lind.*, *Balf.*, *Harvey*, *Landsborough*, *Algæ Brit.*)

N. O. 2. CONFERVACEÆ,—*CONFERVAS.* Lind.—Bal. 276.

Linn. Syst. *Cryptogamia.*

Vesicular, filamentary or membraneous bodies multiplied by zoospores, generated in the interior at the expense of their green matter.

Ulva, *Linn.*

Frond membranaceous, green. Fructification, minute granules mostly arranged in fours.

Ulva latissima, *Linn.* *The Broad Green Laver.*

Frond 4-18 inches long, widely oblong, waved, and of a green color. Edges waved.

Hab. On rocks in the sea at Manora (Sind). Very widely distributed.

Said to be of value in scrofulous cases. Collected in Sind to a small extent in September and October.

Ulva crispa, *Lightft. Dill. t.* 10 *f.* 12. *The Crisp Laver.*

Frond 2-10 inches long, green, blistered, plaited, crisp, rugose, heaped in an expanded layer.

Hab. Manora rocks.

Porphyra, *Ag.*

Frond plain, exceedingly thin, purple. Reproductive organs of two kinds, *I*,—roundish granules in fours covering the frond; *II*, —scattered sori of ovate granules.—*Grev.*

Porphyra vulgaris, *Ag.* *The Purple Laver or Sea Silk.*

Frond thin and membranaceous, not laciniated as in *P. laciniata.* Length of frond 1–2 feet, breadth 2–3 inches.—*Grev.*

Hab Manora rocks, between tide-marks.

This weed is known in Sind by the natives as "Las" or "Lush," evidently from its containing a quantity of gelatinous matter It is gathered just before the monsoon Medicinally it is prescribed by native hakeems as a demulcent in bad cases of scrofula, in conjunction with emulsion of almonds. As an article of diet it is said to be used in many places in the south of England and the Western Isles

N. O. 3. FUCACEÆ,—*SEA-WRACKS.* Lind.—Bal. 276.

Cellular or tubular unsymmetrical bodies, multiplied by simple spores formed externally, contained in superficial cells, which are often bladdery. Vessels scattered through the whole frond, or seated in particular parts.—*Grev., Harvey.*

Represented in most climates from high northern and southern latitudes to the Equator

Sargassum, *Ag*

Frond with distinct stalked, nerved leaves. Air vessels simple axillary and stalked. Receptacles small, linear, tuberculated, mostly in axillary clusters. Seeds in distinct cells.—*Grev.*

Sargassum bacciferum, *Ag.* *Sea-Grapes.*

Leaves nerved, serrate, air vessels axillary, colour olive green.

Found cast up on the beach at Clifton and Manora.

Fucus, *Linn.*

Frond plane, compressed or cylindrical, linear, dichotomous, coriaceous, air vessels when present, innate in the frond, simple and large. Receptacles terminal, (except in *F. nodosus*) turgid; containing tubercles embedded in mucus, and discharging their seeds by conspicuous spores.—*Grev.*

Fucus vesiculosus, *Linn. Eng. Bot* 1066 *Bladdery Sea-wrack.*

Frond plane, compressed, linear, dichotomous, entire at the margin, coriaceous, 2–3 feet long. Root a flat, hard, disk. Air vessels in pairs, large. Receptacles in pairs often forked, terminating the branches, mostly elliptical, turgid.

Hab Manora rocks

The medicinal uses of this weed in Sind, or in any other part of India, are not known The mucus of the saponaceous vesicles is said to be very effectual in removing glandular swellings; and a tincture of the vesicles to be of use as an embrocation in rheumatism. The calcined powder of the plant is said to have the same medicinal virtues, answering also as a dentifrice It is besides valued in the manufacture of kelp and iodine This fucus is said to be the basis of the popular "Anti-fat"

Fucus distichus, *Linn. Eng. Bot. t.* 12. 102. *Distichous Fucus or Sea-wrack.*

Bushy; frond entire, linear, dichotomous, without vesicles, ribbed. Receptacles in pairs, linear, elliptic.

Hab. Manora rocks.

Medicinally this weed is considered deobstruent; and has, also like *F. vesiculosus*, been found efficacious in scrofulous swellings, and also bronchocele.

Fucus nodosus, *Linn. Eng. Bot. t.* 570. *The Knobbed Sea-wrack.*

Root a hard conical mass; branches 2–6 feet long, leathery Stem compressed, inflated with internal vesicles. Receptacles yellow, lateral, distichous. Stalk pyriform.

Hab Sea shores; found thrown up in abundance with *Sargassum bacciferum.*

The air vessels which give buoyancy to this weed are called "crackers" by children, who delight in casting them into the fire, when they soon show that they deserve the name.—*Landsborough*

Laminaria, *Lam.*

Frond stipitate, coriaceous or membranaceous, flat, undivided, or irregularly cleft, ribless. Fructification, clouded spots of spores embedded in the thickened substance of some part of the frond.—*Harvey.*

Laminaria digitata, *Lam.* *Seagirdle, or Tangle.*

Root thick, of clasping fibres; stem woody, 2–6 feet in length, 1–1½ inches in diameter. Frond 2–4 feet in length, occasionally deeply cleft.

Hab. Deep sea. Fronds found thrown up on Clifton and Manora beaches.

Laminaria bulbosa, *Ag. Eng. Bot. t.* 1760. *Bulbous-rooted Tangle.*

Frond plain, undivided; root inflated, bulbous; stalk flat, expanded into a digitate split, entire lamina.

Hab. Deep sea; found thrown up on Clifton beach.

Laminaria saccharina, *Lam.* *Sweet Tangle.*

Gillur-ke putha *Sind, Punjab.*

Root of clasping fibres; stem 1 inch to a foot in length. Frond 1–10 feet in length; 1–16 inches in breadth, occasionally bullated or rugose, cartilaginous or leathery.—*Harvey.*

Hab. In all seas.

As an article of commerce this weed is said to find its way from the Caspian into India. In Thibet it is said by Honigberger to grow in a salt lake. When dried in the sun it exudes a whitish substance resembling Manna, hence called "Mannite,"—which Dr. Stenhouse, in his analysis of various weeds, found in the greatest abundance in this species. Medicinally this weed is employed in Sind for the cure of scrofulous affections. In syphilitic eruptions it is a favorite remedy, exhibited in the form of a syrup in conjunction with a decoction of Quince seeds (*Semina cydonia vulgaris*). In the manufacture of kelp and iodine the Laminarias are much valued.

Zonaria, *Areschong.*

Root coated with woolly fibres Frond flat, ribless, fanshaped, entire or cleft, marked at regular distances with concentric lines, and fringed with articulated filaments; apex involute. Fructification, linear scattered concentric sori.—*Harvey.*

Zonaria pavonia, *Ag.* *Turkey-feathered Zonaria.*

Frond reniform, flabelliform, smooth, membraneous; zones concentric; color green.

Hab All seas, attached to rocks, shells, &c.

Dr. Greville says: "We have few algæ more singular or beautiful than this." It resembles the expanded tail of the peacock, and the concentric lines and capillary fringe on the frond, give it a beautiful appearance in water; and as Dr. Harvey says "gives rainbow colors to the surface."

Dictyota, *Lamour.*

Frond flat, reticulated, membranaceous, dichotomous or irregularly cleft. Root filamentous. Fructification composed of variously aggregated, somewhat prominent seeds on both surfaces of the frond.—*Grev.*

Dictyota dichotoma, *Lamour* *Distichous Dictyota.*

Frond flat, membranaceous, dichotomous, 1–2 feet in length, irregularly cleft. Color olive green.—*Grev.*

Hab. Manora rocks; in pools.

Chordaria, *Linn.*

Filiform, much branched, cartilaginous, solid. Axis composed of densely packed, longitudinal, interlaced, cylindrical filaments. Periphery simple, club-shaped. Spores whorled, seated among the filaments. Fructification, obovate spores.—*Harvey.*

Chordaria flagelliformis, *Ag* *Whiplash or Sea Whipcord.*

Frond much branched; branchlets virgate, somewhat distichous, spreading at base. Length 3–4 feet, twine-like. Color olive green.

Hab. Manora rocks and sea coast in masses.

Bryopsis, *Lamour*

Frond membranaceous, filiform, tubular, cylindrical, branched; branches imbricated or distichous and pinnated, filled with a fine green granuliferous fluid.—*Grev.*

Bryopsis plumosa, *Ag.* *Feathery Bryopsis.*

Frond membranaceous, filiform; filaments branched, naked below, pinnated in the middle. Branchlets opposite, simple. Color deep green.

Hab. Manora rocks; attached to stones.

Codium, *Stackhouse.*

Frond green, sponge-like, globular, cylindrical or flat, simple or branched, composed of tubular, interwoven, inarticulate filaments. Reproductive vesicles attached to filaments near the surface of the frond.—*Grev.*

Codium tomentosum, *Stackhouse. Phyc. Brit. Pl. XCIII.; Eng. Bot. t.* 2. *Downy Codium.*

Frond green, cylindrical, spongy, dichotomous, composed of tubular interwoven filaments; fastigiate. Height 1-3 feet.

Hab. Manora rocks; in April and May.

Codium bursa, *Ag.*; *Grev. Algæ Brit. p.* 186. *Sea Purse or Purse Codium.*

A spongy mass. Frond subglobose, hollow, dark green.

Hab. Manora rocks. Common in all seas.

N. O. 4. CERAMIACEÆ,—*ROSETANGLES.* Lind.—Bal. 276.

Linn. Syst. *Cryptogamia.*

Cellular or tubular unsymmetrical bodies, multiplied by tetraspores. *Lind.*

These are seaweeds of a rose or purplish color, seldom violet or olive, very attractive by the loveliness of their hues, the delicacy of their structure, and elegance of their forms. Fructification of two kinds, either of spores in external or immersed conceptacles, or densely aggregated together and dispersed throughout masses of the frond, or of tetraspores of a red or purple color, external or immersed in the frond, and each enveloped in a pellucid skin, which separates at maturity into four sporules. —*Harvey.*

Attached to rocks, and to shells, stones and corallines. Many are parasitic upon the larger weeds.

Callithamnion, *Agardh.*

Frond rosy or brownish red, filamentous; stem either opaque and cellular, translucent and jointed; branches jointed, one-tubed, mostly pinnate; dissepiments hyaline. Reproductive organs of two kinds. *I,*—external tetraspores, scattered along the ultimate branchlets, or borne on pedicels; or *II,*—roundish berry-like receptacles (favellæ), seated on the main branches, and containing numerous angular spores.—*Harvey.*

Callithamnion plumula, *Lyngbye. Feathery Callithamnion.*

Frond rosy red; branches pectinated. Capsules small, dotted with large dark red favellæ.

Hab. Manora rocks. Very common.

Callithamnion corymbosum, *Ag. Corymbose Callithamnion.*

Frond with principal stems; branches alternate, branchlets obovate, corymbose; capsules on the sides of the ramuli; favellæ binate and large in the axils; color rose-red.

Hab. Deep sea, on algæ. A fine mounted specimen of this was given me by Mr. E. Leggett, solicitor. Collected at Manora.

Ceramium, *Roth.*

Filaments articulated, dichotomous, reticulated with veins; dissepiments opaque. Fructification, *I*,—capsules, with a membranous pericarp, simple or lobed, generally subtended by one or two short ramuli, and containing numerous angular seeds; *II*,—oblong granules, partially embedded in the joints of the lesser ramuli.—*Harvey.*

Ceramium rubrum, *Ag.* *Rosy Ceramium.*

Filaments dichotomous, much branched, somewhat cartilaginous; branchlets forked. Articulations ovate, opaque; capsules globular.

Hab. Manora rocks.

Ceramium pedicellatum, *Ag.*; *Dilw. Conf. t.* 108. *Stalked Ceramium.*

Filaments setaceous, dichotomous; articulations thickened upwards, about five times as long as broad. Color orange.

Hab. Manora rocks.

Chondrus, *Stackhouse.*

Frond cartilaginous, dilating upwards, flat, dichotomous, purplish or livid red color. Fructification prominent tubercles of radiating filaments dissolved into spores; or tetraspores collected into sori, immersed in the substance of the frond.—*Harvey.*

Chondrus crispis, *Lyngbye.* *Carrageen or Irish Moss.*

Frond membranaceous, cartilaginous, dichotomous; color light red.

Hab. Manora rocks.

Extensively used in Ireland as an article of food, and employed instead of isinglass for the manufacture of *blanc-mange* and jellies.

Rhodymenia, *Grev.*

Frond plain, membranaceous, fine pink, or red, veinless, sessile. Fructification hemispherical scattered capsules, or minute ternate granules spreading over the whole or some part of the frond.—*Greville.*

Rhodymenia jubata, *Grev. Pl. XI.* 43; *Eng. Bot. t.* 1042.

Frond flat, membranaceous; branchlets setaceous; color fine pink.

Hab. Manora rocks.

ALLIANCE 2. *FUNGALES.*

N. O. 6. HYMENOMYCETES,—*TOAD-STOOLS.* Lind.—Bal. 274.

Agaricus campestris, *Linn.* *Common Mushroom.*

The dried fungi.

Vernacular—Moksha, Khumba, Booeephore, *Hind., Sind, Punj.*

The common mushroom is abundant everywhere on the plains of India, and esteemed by the natives of Sind and the Punjab as a vegetable; great care is however necessary, as cases of accidental poisoning by mushrooms are by no means uncommon. According to Dr. Badham there are 5,000 recognised species, of which only a few can be safely eaten. Among them the fungus under notice and *A. esculentus* are perhaps most commonly employed as food. It is a curious fact that the poisonous properties vary with climate, and probably with the season of the year when gathered. Another circumstance deserving notice is that, by idiosyncrasy, some individuals are liable to be seriously affected, even by species usually regarded as innocent. Some which are poisonous in one country are not so in another; as for instance the species under notice *A. campestris,* which is largely eaten in England and in India, is regarded as poisonous in Rome; and accordingly rejected. There do not appear to be any satisfactory rules for distinguishing between the wholesome and poisonous mushrooms. The best test is the one assigned by Dr. Christison, viz., that the poisonous vegetable has an astringent styptic as well as a disagreeable taste, and certainly a pungent odour. The inhabitants of Southern Punjab and Afghanistan, who use mushrooms very largely as food, distinguish the edible species by their color, which is always white, while the non-edible is dark. The poisonous principle is called *Fungin*; it is of a volatile nature, and is soluble in hot water. Some varieties of noxious mushrooms may be eaten with impunity, when they have been well boiled in water and afterwards pressed.

In its dried form as the "Mokshai" of the bazaars this fungus (*A. campestris*) is officinal, and prescribed as an alterative.—(*Lindley, Dr. Stewart, Taylor on Poison.*)

Class II. Acrogens.

ALLIANCE 6. *FILICALES.*

N. O. 24. POLYPODIACEÆ,—*FERNS.* Lind.—Bal. N. O. 267.

Polypodium vulgare, *Linn.* *Common Polypody.*

Linn. Syst. *Cryptogamia.*

The root.

Vernacular—Bisfaij, Balookunboon, *Hind.*

Extremely common on the Bhore Ghauts and above, in the Lanowlee forests, and the Himalayas.

Employed in native pharmacy as an alterative in melancholia. The ashes of the plant contain a quantity of carbonate of potash used in fusing flint in the manufacture of glass. Taken in an electuary with honey, it is said to cause abortion.

Adiantum capillus-veneris, *Linn.* *True Maiden Hair.*

Linn. Syst. *Cryptogamia.*

The leaves.

Vernacular—Pursha, Hansraj, Moobarka, *Hind.*; Shaur-ul-Jin, *Arab.*

Found on old walls during the rains in the Concan, and in the forests above the Bhore Ghauts, the Himalayas, in wells in Sind, the Punjab plains, in the Siwalick tract up to 8,000 feet, and at Quetta in Beloochistan.

In the Punjab this is administered with pepper as a febrifuge, and in the Southern and Western Presidencies with honey in catarrhal complaints. Syrup of Capillaire is much prized in France and Portugal in pulmonary affections. A similar syrup is also made from the leaves of *A. caudatum* and *A. lunulatum*, and employed by native practitioners as a diuretic and emmenagogue.—(*Loudon, Ainslie, Dr. Stewart.*)

Class IV. Endogens.

ALLIANCE 7. *GLUMALES.*

N. O. 29. GRAMINACEÆ,—*GRASSES.* Lind.—Bal. N. O. 266.

Annual herbaceous plants with fibrous or bulbous, frequently branching rhizomes. Stems cylindrical, jointed, hollow, sometimes solid. Leaves narrow, alternate having a split sheath, and often a membrane at the base of the lamina (ligule). Flowers usually hermaphrodite, sometimes unisexual or polygamous, either solitary or arranged in spikes or panicled locustæ, consisting of imbricated bracts; outer glumes, or bracts usually 2, alternate. Paleæ 2, alternate. Stamens hypogynous, 1-6 or more. Anthers versatile, 2-celled. Ovary simple, 1-celled, with 2–3 distinct styles. Ovule ascending, anatropal, stigmas feathery. Embryo lateral, naked.

Leersia aristata, *Roxb. Fl. Ind. ii.* 207.

Linn. Syst. *Triandria Trigynia.*

Vernacular—Chawrun, *Sind.*

Culms, jointed long, floating in water; sheaths longer than the joints, about as long as the leaves; leaves sheathing, sub-lanceolate, scabrous, cordate at the base, clouded and striated with dark brownish spots. Panicles diverging, thin; flowers paired, hermaphrodite. Calyx; glume 1-flowered, 2-valved. Exterior valve-awned.

Common on the Malabar coast, Concan, Kutch and Sind, in standing water, lakes and pools after the rains.

Oryza sativa, *W. Roxb. Fl. Ind. ii.* 200. *Common Rice.*

Linn. Syst. *Hexandria Digynia.*

Vernacular—Ashoovirhee, *Sans.*; Chawal, *Hind., Dec.*; Sari, *Sind*; Dhan, *Beng.*; Shalee, *Pers.*; Roos, *Egypt.*

The native place of this like other kinds of grain in common use is unknown. There are no less than 160 different varieties known. According to Dr. Birdwood, 50

different varieties are cultivated in the Western Presidency, and about 160 recognised in Ceylon. About 10 different varieties are cultivated in Sind at Syudpoor, Tatta, Roree, Goonee, Shahbunder and Dadoo, &c., and in the Punjab they are also numerous. Rice, in the Punjab, is cultivated in the plains where the soil is low and good and water abundant, especially in the upper part of the Jullundur Doab. It is also abundantly grown throughout the Siwalick tract and up the valley to an elevation, in places of 6,000 or even nearly 7,000 feet, the best being called "basmatee" (literally "the odorous"). Rice contains about 85 per cent. of starch, 3·5 gluten, a little gum, water, sugar and phosphate of lime.

Zea mays, *W.*; *Roxb. Fl. Ind. iii. p.* 567. *Indian Corn.*

Linn. Syst. *Monœcia Triandria.*

Vernacular—Yavanala, *Sans.*; Boota, *Hind.*; Bajree, *Pers.*; Makai, *Sind.*

Known in its cultivated form all over India, America and parts of Europe. The corn is the staple food of the Americans and of the inhabitants of parts of the Punjab and Berars. It is highly nutritive, and is said to be superior to rice and many other cereals. Coarsely ground, it makes excellent gruel. The "cob" or receptacle is a favorite vegetable wherever it is cultivated, either parched or boiled, especially in the West Indies and America, and is as "Bhoota" a choice luxury to the poor in our own bazaars. The stalks are valuable as fodder.

Alopecurus pratensis, *W.* *Meadow Foxtail Grass.*

Linn. Syst. *Triandria Digynia.*

Annual; stem erect, smooth; panicle sub-spiked, cylindrical, obtuse, thick; glumes fringed, connate below the middle.

Common in Sind, Kutch and Punjab. An excellent meadow grass; much relished by cattle.

Panicum colonum, *Linn.*; *Roxb. Fl. Ind. i. p.* 296. *Purple Panic Grass.*

Linn. Syst. *Triandria Digynia.*

Vernacular—Sawuk, Junglee Sawuk, *Sind.*; Sanwuk, *Punjab.*

Lower culms creeping and taking root, upper culms erect or sub-erect, ramous; leaves tapering to a point; spikes alternate, one-sided, beardless, ovate, rough; spikelets 6–12; rachis roundish; flowers sessile.

Found in Sind, Mekran, Kutch, and Bengal.

A good fodder grass, and might be cultivated. The seeds are often eaten by the poorer classes. Bellew mentions that in the Peshawur Valley this seed is often eaten during Hindoo fasts; and that with milk it has for 30 years constituted the chief food of the Akhoond of Swat, for whom it was cultivated.—(*Dr. Stewart.*)

Panicum coloratum, *W.* *Colored Panic Grass.*

Linn. Syst. *Triandria Monogynia.*

Vernacular—Dhand, *Sind.*

Annual, erect, ramous; leaves tapering; spikes alternate, lateral; spikelets appressed; panicles spreading; pistils and stamens colored.

Sind, Egypt, Arabia.

The cultivated species are *P. italicum*, *P. milliaceum*, and *P. frumentaceum.*

Pennisetum cenchroides, *Rich.* *Ciliated Cenchroides.*

Linn. Syst. *Triandria Monogynia.*

Vernacular—Dhaman, *Punj.*, *Sind*, and *Kutch.*

Culms erect, jointed, ramous ; involucre alternate, feathery, longer than the flowers. Affords excellent forage.

Cenchrus echinatus, *Linn.* *Rough-spiked Cenchrus.*

Linn. Syst. *Triandria Monogynia.*

Vernacular—Bhort, Basla, *Sind*; Lapta, *Punjab.*

Culms erect, straight, 6–18 inches high ; leaves long, slender, rough with asperites; spikes at the top solitary, cylindric ; spikelets approximated ; rachis three-sided ; involucre, multipartite, two-flowered ; segments subulate, hooked, villous.

Sind up to the Kirthur range. Abundant at the Hubb, also in the Punjab and Kutch.

Is a good fodder The seeds, according to Dr. Stewart (*Punj. Plants*) are frequently eaten in the Punjab in times of scarcity.

Aristida depressa, *Retz.*

Linn. Syst. *Triandria Digynia.*

Vernacular—Lumb, *Sind* ; Jandar, Lumba, *Punj.* and *Kutch.*

Upper culms ascending, filiform, solid ; below depressed, branchy ; leaves few, round ; margins involute ; panicles small, drooping.

Sind, Punjab and Kutch, in dry soil ; not much liked as forage by cattle.

Arundo karka, *Linn.* ; *Roxb. Fl. Ind. i. p.* 348.

Linn. Syst. *Triandria Digynia.*

Vernacular—Sur, *Sind* ; Nuda Nar, *Hind.*, *Beng.*

Culms erect, smooth, leafy, 10–15 feet high ; leaves gladiate, approximate, 8–20 inches long, 1½ broad ; sheaths bearded ; panicles erect ; calyx 3–5 flowered ; glumes not equal.

Extremely common in Sind and Kutch ; chairs, baskets and other articles are made from the reeds, and a soft rope from the fibres obtained by macerating and beating the flower stalks.

Cynodon dactylon, *P. S.* *Creeping Cynodon.*

Linn. Syst. *Triandria Digynia.*

Vernacular—Dub, Hurrialee, *Sind*, *Dec.* ; Doorba, *Beng.* ; Khabbur, Dub, *Punj.*

Stolones creeping ; flower bearing stems erect ; 6 inches high ; leaves small, smoothed, fringed at the edge ; spikes 4–5, terminal, sessile ; glumes rough, spreading ; flowers alternate, purplish, awnless.

The *Agrostis* of the Greeks according to Fraas. Found throughout India. The commonest but most valuable of the grasses for fodder. Sir W. Jones in the *Asiatic Researches* vol. IV observes : "It is the sweetest and most nutritious pasture for cattle, and its usefulness added to its beauty induced the Hindoos in their earlier ages to believe that it was the mansion of a benevolent nymph." It forms the greater portion of the food of cattle in India, and universal testimony holds it forth as the best of all the grasses for fattening and milk-producing. The roots are employed in Sind as a substitute for Sarsaparilla.—(*Dr. Stewart, Asiat. Res.*, vol. IV, p. 243.)

Dactylotenium ægyptiacum, *Roxb. Fl. Ind. i. p.* 344 ; *Rheede Mal. xii.* 69. *Creeping Dactylon.*

Linn. Syst. *Triandria Digynia.*

Vernacular—Chubr, *Sind* ; Chimbar, Madana, Chubrei, Chimbaree, *Punj.*

Stems erect, ascending ; leaves small, opposite, lanceolate; spikes 4–5 partite, obtuse, spreading, mucronate.

Punjab, Sind, Kutch and Deccan ; plentiful in the plains beyond Kurrachee towards the Pubb ranges ; is considered a nutritious pasture.

Poa ægyptiaca, *W.* *Egyptian Meadow Grass.*

Linn. Syst. *Triandria Digynia.*

Vernacular—Chubburee, *Sind.*

Annual, 2 feet high ; culms ramous, creeping at the base, above expanding ; leaves small, smooth ; mouth of sheaths hairy ; panicles equal, diffuse ; spikelets contracted, linear, 8–12 flowered ; florets smooth, ligule ciliated.

Sind, Arabia, Egypt, Punjab, Concan, Deccan, Kutch.

Poa chinensis, *Linn.* ; *Roxb. Fl. Ind. i. p.* 332.

Linn. Syst. *Triandria Digynia.*

Culms smooth, ramous, 2–4 feet high, creeping near the base, above expanding ; leaves small ; mouths of sheaths bearded ; panicles large, oval, of many alternate simple filiform secund branches ; spikelets alternate, short pedicelled, 4–6 flowered ; disposed in two rows.

Sind, Arabia, Deccan, Concan, Kutch and Bengal.

Poa cynosuroides, *Retz.* ; *Roxb. Fl. Ind. i. p.* 333.

Linn. Syst. *Triandria Digynia.*

Vernacular—Doob, Khoosh, *Hind.*, *Sind* ; Pavitra, *Sans.*

Culms smooth, straight, 1–4 feet high ; leaves numerous, long ; panicles linear-oblong or conical ; spikelets many-flowered, expanding in two rows ; glumes 2, pointed, outer glume shorter.

Mekran, Sind, Northern and Southern Presidencies, Deccan and Concan. Generally on dry barren land.

Dinebra arabica, *Jacq.*

Stems procumbent, sheathed ; leaves sessile, lanceolate ; spikes alternate, panicled on one side, glumes equal ; spikes 2-flowered ; flowers stalked ; valves subulate ; paleæ bifid ; lower paleæ setaceous.

Sind, Mekran, Pubb, and Egypt.

Bambusa arundinacea, *Retz.*; *Roxb. Fl. Ind. ii. p.* 191. *Common Bamboo.*

Linn. Syst. *Hexandria Monogynia.*

The siliceous secretion of the female plant.

Vernacular—Vungsha, *Sans.*; Bans, *Hind., Dec.* The siliceous secretion. Tabasheer, *Hind., Pers., Arab., Sind.*

This gigantic grass is extremely common in Southern and Western India and in Mysore, Kanara, Khandeish, Travancore, Southern Mahratta Country, and Central India. It is needless to detail the numberless economic uses to which the gigantic stems are applied. The siliceous secretion or milk of the Bamboo (Tabasheer) is deposited in the joints of the female bamboo. It is composed of silica and vegetable matter. The most recent and complete analysis of it is by Prof. Thomson of Glasgow (*Records of General Science*, 1836), who found its constituents to be in 100 parts—Silica 90·50, potash 1·10, peroxide of iron 0·90, alumina 0·40, moisture 4·87, loss 2·23.

In Southern India it is used in the cure of paralytic affections. By the Arabs it is esteemed aphrodisaic. The tender shoots of the bamboo are pickled by the Chinese (*Ainslie, Pharm of Ind.*) In Sind *Tabasheer* is considered a valuable tonic.

Saccharum munja, *Roxb. Fl. Ind. i. p.* 246.

Linn. Syst. *Triandria Digynia.*

Vernacular—Surputta Munja, *Hind.*; Sarr, Sirkee, *Sind*; Sarkanda, Sarra, *Punj., Kutch.*

Culms 10–12 feet high, straight, smooth; leaves long, channelled, linear; white nerved. Panicles large, spreading, oblong; ramification whorled; flowers hermaphrodite.

Common on the banks of the Indus to above Sukkur, and in the Punjab and Kutch covers extensive tracts of land. It may also be found on the banks of the Ganges.

From the stems and leaves a fibre is obtained by maceration and beating, which is made into good serviceable rope used by the boatmen on the Indus.

Saccharum spontaneum, *Linn.*; *Wild. i. p.* 321. *Thatch Grass.*

Linn. Syst. *Triandria Digynia.*

Vernacular—Khau, Kahoo, *Sind*; Kahi, *Punjab*; Kash, *Beng.*

Annual; culms erect, leafy, round, solid, 4–14 feet; leaves long, narrow; margins covered with long stiff hairs; mouths of sheaths woolly; panicles terminal, erect, oblong, 12–20 inches long; flowers paired, one pedicelled, the other sessile; glumes 2-valved, fringed with hairs; paleæ 1-valved, ciliate; stigma plumose, purple.

Sind, Punjab, Kutch, Bengal, Madras and Deccan.

Reeds used as pens by natives—also for thatching, &c.

S. officinarum, or common *Sugarcane*, is cultivated in Sind at Mulleer.

Chloris barbata, *Wild.* 4, *p.* 926; *Roxb. Fl. Ind. i. p.* 111. *Bearded Chloris.*

Linn. Syst. *Triandria Digynia.*

Annual; lower portion of clum creeping, ramous; leaves bifarious

at the base, mouths ciliate; spikes terminal, many fasicled, sessile; flowers pedicelled, alternate, in double rows; glumes ciliate, bearded, two valved; male valves ventricose.

Grows in large tufts everywhere in Sind, Kutch, the Coromandel and Arabian coast.

Cattle eat this grass, but it is not considered good fodder.

Andropogon annulatus, *Forsk.*

Linn. Syst. *Triandria Digynia*

Vernacular—Palvan, *Punj.*; Daynoo, *Sind.*

Annual, appearing immediately after the rains, rising to 2 and often 3 feet, with erect, slender culms; leaves sheathing, as long or longer than the joints; panicles terminal, erect, fasicled.

Abundant in Sind, Kutch, Punjab and Bengal.

Excellent fodder for oxen; considered very nutritious when green.

Andropogon ischæmum, *Linn.*; *Roxb. Fl. Ind. i. p.* 259. *Woolly Andropogon.*

Linn. Syst. *Triandria Digynia.*

Vernacular—Khay, *Sind.*

A small erect annual 1–2 feet high; leaves small, smooth; spikes terminal, peduncled, digitate, about 8; florets twin, woolly at base, hermaphrodite, sessile, bearded.

Sind, Kutch, Coromandel coast, Bengal.

Andropogon involutus, *Steud.*

Linn. Syst. *Polygamia Monœcia.*

Vernacular—Baggiar, *Sind, Punj.*

Culms erect, jointed; leaves longer than culms, ciliate at the base; spikes about 6, terminal; florets twin, bearded.

Found in Upper Sind, Punjab, Siwalick tract, and outer Himalayas at from 2,300 to 4,000 feet up to the Indus, and beyond also.

Used commonly for cordage, swing bridges, &c. and probably supplies in the Punjab, as in the N. W. P., most of the "Baggiar" fibre which is used for making rope. (*Dr. Stewart.*)

Andropogon contortus, *Roxb. Fl. Ind. i. p.* 253. *Heteropogon Aristatus. R. S.*

Linn. Syst. *Triandria Digynia.*

Vernacular—Suraree, Surrar, Surialee, *Sind.*

Culms erect, round, jointed, 1–3 feet high; joints smooth leaves; bifarious with scattered hairs; margins ciliate; spikes simple, terminal, bowing; lower flowers beardless; calyces hairy; awns long, hirsute.

Common in Sind, Punjab, Deccan, Guzerat, Coromandel coast, in fact throughout India.

Good fodder when young. The long twisted awns prove troublesome to travellers passing through plots of this grass owing to their sticking on the clothes and skin.

Cenchrus echinatus (Bhort, Sind). Another grass found in Sind, and the Punjab also, causes similar annoyance. According to Dr. Stewart the seed is frequently eaten in times of scarcity.

Digitaria sanguinalis, *P. S. Slender-spiked Finger Grass.*

Linn. Syst. *Triandria Digynia.*

Vernacular—Karash, *Sind, Punjab.*

An erect annual; leaves as long as the joints, sheathed at base; spikes digitate, 4–5 spreading, erect; florets oblong, pubescent; glume 2-valved, lower valves minute.

Abundant throughout Sind, Arabia, Egypt. Found also in the Punjab. Is a good fodder grass.

Digitaria ægyptiaca, *W. Egyptian Finger Grass.*

Linn. Syst. *Triandria Digynia.*

Annual, erect, 1–1½ feet; spikes digitate, erect, 5–7; leaves nearly as long as the joints, hairy; sheaths hairy; glume 2-valved; paleæ fringed; florets acute, oblong.

Sind, Beloochistan, Kutch, Concan and Deccan.

The seeds are said to be good food, boiled in milk.

Dactylis lagopoides, *Linn.; Roxb. Fl. Ind. i. p.* 341.

Linn. Syst. *Triandria Digynia.*

A creeping grass with numerous acute, rigid, spinous-pointed leaves which sheath the culm; spikes terminal, globular, pedicelled; calyx 5–10 flowered; glumes hairy.

Common in the salt sandy soil along Sind and Coromandel coasts.

Not used as fodder.

Phalaris muricata, *Forsk.; Roxb. Fl. Ind. i. p.* 281.

Linn. Syst. *Triandria Digynia.*

Vernacular—Dhurcharro, *Sind.*

This is a small creeping grass 6–12 inches high, with short sheathing leaves; margins ciliate and waved; spikes terminal, pedicelled; calyx mucronate, bristly, 1-flowered, 2-valved.

Found in Arabia, on the Coromandel and Malabar coasts, Kurrachee, also Salsette in abundance. Yields good grazing for sheep and goats.

[The CEREALS cultivated in Sind are different varieties of wheat, *Triticum æstivum* (kunnuk, Sind), barley, *Hordeum hexsastichon* (jow, Sind) much used as food for horses; two varieties of *Soorghum vulgare,* a grain much used in Sind and the Deccan as food, and to which, according to Niebhur, the natives of Egypt, Mesopotamia and Assyria give preference and will exchange their wheat for it.

Rice, *Oryza Sativa,* of different varieties—the staple food. throughout India, is also extensively cultivated; beside *Zea mays,* or Indian corn, *Panicum frumentaceum, Miliæceum italicum, Pencillaria spicata, Eleusine coracana* and *Festuca fluitans,* the straw, or plants of all being used as fodder. The pasture grasses of Sind have been noted. Those most relished by horses, cattle and sheep are *Cynodon dactylon,* (Dub Durba or Hurrialee, Hind.) the sweetest and most nutritious of grasses, abundant everywhere, *Poa cynosuroides, Andropogon involutus, Anthistiria ciliata, Alopecurus pratensis, Dactylis glomerata* and *Digitaria sanguinalis* and the straw of all the grain grasses. None of the camel fodder plants belong to the Graminaceæ, but they have often been noticed feeding on the stalks of *Soorghum vulgare* and *Pencillaria spicata.*]

N. O. 30. CYPERACEÆ,—*SEDGES*. Lind.—Bal. N. O. 265.

Grass-like, tufted plants, with fibrous roots. They resemble grass in appearance, and may be called the grasses of moist soils; but may be distinguished by important points of structure. The stems are solid, and usually angular, without joints or diaphragms at the articulations. Leaves narrow, entire, and not split as in grasses. Inflorescence capitate. Flowers monœcious, without a perianth, each borne on a solitary bract, and united together, forming an imbricated spike. Lower bracts often empty. Calyx none. Stamens hypogynous, definite, 1–12; commonly 3. Anthers entire, fixed by their base, 2-celled; ovary 1-seeded, superior, surrounded by setæ. Ovule erect, anatropal. Style single 2–3 cleft. Stigmas undivided, sometimes bifid. Nut crustaceous. Albumen fleshy. Embryo lenticular. Plumule inconspicuous.

Found mostly in marshes, ditches, running streams, groves, and on the sea-shore.

Cyperus rotundus, *Roxb. Fl. Ind. i. p.* 197.

Linn. Syst. *Triandria Monogynia.*

The root.

Vernacular—Motha, *Hind.*; Nagurmotha, *Hind., Bengal*; Mostaka, *Dec.*; Bhadra Muste, *Sans.*

Common in moist localities throughout India, and very troublesome in gardens; being difficult to extirpate. The roots are ovoid and spongy; possessing a slightly aromatic sweet odor, taste bitter, resinous, and balsamic, especially when dry (*Beng. Disp.* p. 62). Stimulant, diaphoretic and diuretic properties are assigned to them, and in the *Taleef Shereef* (p. 159) they are said to be astringent and vermifuge. As a powerful tonic they are in much repute amongst natives, and are employed chiefly in disorders of the stomach and irritable state of the bowels. The roots of *C. pertenuis* are dried and powdered, and used as a perfume. They partake of the aromatic properties of *C. rotundus*, and are also regarded as diaphoretic and diuretic. —(*Lindley, Pharm. of Ind., Loudon, Ainslie, Roxb., Royle.*)

Cyperus conglomeratus, *Willd. xii.* 277; *Roxb. Fl. Ind. i. p.* 209.

Many-flowered Cyperus.

Linn. Syst. *Triandria Monogyina.*

Vernacular—Cheeo, *Sind.*

A perennial, with erect culms, 6–12 inches high, three-cornered, little more than two-thirds naked, smooth; angles sharp; leaves sheathing, channelled, longer than the culm; spikelets ovate, clustered; involucre 4-leaved, largest, the length of the umbel, the smallest the length of the spikes.

Sind and Kutch in moist places.

Cyperus pygmæus, *Rottb. Gram.* 20. *t.* 14. *f.* 4 *and* 5.

Linn. Syst. *Triandria Monogynia.*

Vernacular—Deela, Nundah Cheeo, *Sind.*

Culms 4–5 inches high; leaves as long as the culm; head terminal, globular, glomerate; scales mucronate, recurved; involucre, three leaved.

Sind, Concan, Kutch, Malabar and Coromandel coasts, in moist situations.

Scirpus pectinatus, *Linn.*; *Roxb. Fl. Ind. i. p.* 218.; *Malacochæte pectinata. N. Ab. Esen. p.* 110. *Saltmarsh Spike-rush.*

Linn. Syst. *Triandria Monogynia.*

Vernacular—Deela.

Culms erect, leafy, 3–4 feet high, 3-cornered, smooth; angles sharp; leaves sheathing, keeled; panicle lateral, glume bifid, mucronate; involucre, 3-leaved.

Kutch and Punjab, Lower Sind, Coromandel and Malabar coasts in marshes

Deela is also the synonyme of *Scirpus maritimus,* Linn. Common in Sind and the Punjab.

Mariscus umbellatus, *Vahl.*; *Roxb. Fl. Ind. i. p.* 182.

Linn. Syst. *Triandria Monogynia.*

This is a tuberous-rooted sedge with erect three-sided culms, 1–2 feet high, nearly naked; leaves sheathing, as long as culms; umbel terminal, sessile, compound, peduncled, spikes cylindrical, imbricated; spikelets few flowered; glumes in two rows, imbricated; involucre many leaved.

Common near the sea shore Kurrachee, Coromandel, Kutch and Malabar coasts.

Kyllingia monocephala, *Linn.*; *Rottb. Gram. t.* 4. *f.* 4; *Roxb. Fl. Ind. i. p.* 180. *One-headed Kyllingia.*

Linn. Syst. *Triandria Monogynia.*

Culms 6–12 inches high, three-sided, naked, except at the base; leaves as long as the culm, carinate, head globose, sessile, solitary; involucre long, 3-leaved, unequal; largest as long as the culm; glume 2-valved, chaffy; stigma trifid. Seed oblongate, compressed, brownish white.

Sind, Deccan and Concans.

The roots of this sedge are fragrant and aromatic, and are used medicinally where found.

Kyllingia triceps, *Linn.*; *Rottb. Gram. t.* 4. *f.* 6; *Roxb. Fl. Ind. i. p.* 182. *Three-headed Kyllingia.*

This sedge only differs from *K. monocephala* in having 3 sessile clustered heads, and being diandrous with a bifid instead of a trifid style. Culms obtusely 3-sided with rounded instead of sharp angles. Seed oblong.

Typha elephantina, *Roxb. Fl. Ind. iii p.* 566. *Elephant Grass.*

Linn. Syst. *Monœcia Triandria.*

Vernacular—Pun, *Sind*; Hagla, *Beng.*

Perennial; culms straight, 6–10 feet high, round, smooth, jointed at the insertion of the leaves; leaves long, ensiform,

obtuse, flat on the inside, as long or nearly as long as the stem, about 3–4 inches broad; sheath smooth, embracing the culms. Male catkin 2–3 inches above the female, cylindric, 8–10 inches long, densely covered with stamens, and numerous 2–3 cleft fine filaments, each with 2–3 anthers. Anthers linear. Female catkin 8–10 inches long. Glume with fine filaments.

Sind, on the banks of the Indus and the margins of tanks and beds of rivers; also throughout the Concans.

The long tortuous and strong roots of this grass penetrate to the depth of about 6 or 8 feet in the soil, which it holds together with a degree of firmness that prevents the falling in of the banks that is so inconvenient a feature on the Indus. Of this grass, ropes, mats and baskets are made, also rude boats called "Tinho" used to cross the river during the inundation. From the pollen is made the "Boor" or "Booratoo," much eaten by the natives of Sind.

Typha latifolia, *Willd. Spec. iv. p.* 197; *Typha angustifolia. Willd iv. p.* 97. *The Lesser Bulrush.*

Linn. Syst. *Monœcia Triandria.*

Vernacular—Kundar, Lukh, *Punjab*; Nindo-pun, *Sind*; Junglee Bajree, *Dec.*

Root stoloniferous; culms straight, round, jointed at the insertion of the leaves. Leaves semicylindric, acute, the length of the scape. Sterile and fertile catkins, a little distant from each other.

Common in Sind, Punjab, Deccan, and probably also Kutch.

The roots are said by Dr. Stewart (*Punjab Plants*) to be eaten in Kashmir and on the Sutledge; and the lower succulent part of the stem to be used as in Sind for clearing the turbid water of the river, which it does both speedily and effectually.

ALLIANCE 9. *PALMALES.*

N. O. 38. PALMACEÆ,—*PALMS.* Lind.—Bal. N. O. 151.

Areca catechu, *W. Medicinal Cabbage Tree, or Betel-nut Palm.*

Linn. Syst. *Monœcia Hexandria.*

The extract and nut.

Vernacular—The nut, Sooparee, *Hind., Dec.*; Gooa, *Beng.* The extract, Kath, Kutha.

Extensively cultivated in Malabar, Bengal, Ceylon and other parts of India. It yields the well known Betel-nut of commerce, which, when young and tender, is occasionally prescribed in conjunction with other drugs in cases of costiveness, consequent on dyspepsia (*Ainslie, Mat. Ind.* vol. II. p. 269). When ripe it is used with the leaf of *Piper betel,* lime and catechu as a masticatory. It is also stated (*Ainslie*) that in the West Indies the extract of the nut is supposed to strengthen the stomach. Bruised and macerated in water for twelve hours the nut is given to horses as a purgative. Burnt and powdered it affords a good dentifrice, used in preference to burnt almond shell or charcoal powder.—(*Ainslie, Roxb., Loudon, Pharm., Lindley.*)

Phœnix dactylifera, *Willd. iv. p.* 730; *Roxb. Fl. Ind. iii. p.* 787. *Date Palm.*

Linn. Syst. *Diœcia Triandria.*

The seed of the fruit and fruit.

Vernacular—Kujjur, *Hind.*; Pind Chirdi, Kurma, *Sind, Punjab,* and *Beloochistan.*

The *Tamar* of Scripture, which has been universally acknowledged to denote the Palm tree, first mentioned in Exod. xv. 27, "when the Israelites encamped at Elim, where there were twelve wells, and three score and ten palm trees."

The name *Tamar* seems to have been applied to the city which Solomon built in the desert, probably on account of the palm trees growing about it, and no doubt the name *Palmyra,* from *Palma* a *palm,* was applied to it by the Romans on the same account. Jericho being called the city of palm trees, also arises from a similar circumstance. The Greeks called the tree PHOINIX from *Phœnicia,* whence the best dates were brought, distinguishing the female as EPHŒNIX BALANOPHORUS, and the male as O PHOINIX ERSEN. The male flowers they called ELATE and SPATHE, and the fruit PHŒNIKOBALANOS. Palms are characteristic of tropical countries, and but few may be seen beyond 40° in the northern hemisphere and 35° in the Southern. In the old world the species under notice (*P. dactylifera*) extends the furthest north. It spreads along the Euphrates and Tigris to Palmyra; and to the Syrian coast of the Mediterranean.

In India it is cultivated. In Sind and in the Southern Punjab, particularly near Mooltan and Moozuffurgur, it is commonly self-sown. In Sind it has already attained a certain amount of perfection, and about Khyrpore and Sukkur yields excellent fruit. By care good varieties might be obtained, and much barren land covered with lofty trees of long duration, whence other obvious advantages would result. It is grown also in the Deccan and Guzerat, but does not thrive in Bengal. The fruit is its most useful product. It forms the staple food of the inhabitants of Arabia, part of Syria, Persia, Mekran, and North Africa; even the hard stones are utilized, being ground in hand-mills to afford nourishment to the camel. From the leaves, baskets, mats, fans and a number of articles are made; and from the fibres of the foot stalks a coarse cordage. Toddy, or Palm wine, is universally known where this palm is found, and a strong spirit is obtained by distillation. Sugar is also made by boiling the fresh sap. The fruit is recommended in piles, and is said to strengthen the stomach and intestines; also to stop diarrhœa, and promote expectoration, for which it is given in pectoral decoctions.—(*Kitto, Bib. Encyc., Lindley, Loudon, Brandis, Dr. Stocks, Dr. Stewart.*)

Chamærops ritchiana, *Griff.*

Linn. Syst. *Polygamia Diœcia.*

Vernacular—Fees, pease, pfaar, *Sind*; Pis, *Beloochistan*; Mazree, Mazuray, Peer Putta, *Hind.*

A dwarf, generally stemless palm, with greyish green coriaceous leaves. Petioles entire, unarmed, 6–12 inches long; base with a mass of rust-colored wool-like substance instead of a fibrous sheath. Segments 8–15, linear, rigid, about 12 inches long, deeply cut in two. Flowers in slender panicles; male flowers bisexual, on a paleæ-like bracteole; calyx trifid; petals 3; stamens 6. Fruit oblong, 1-seeded.

This plant, which Bellew calls "Tiger grass," and Masson writes of as aloe, is abundant in the Peshawur Valley, Kohat and in the Trans-Indus territory along the skirts of the Suliman range; principally on and near the eastern skirts from the plains to 3,000 feet; also on the hills which form the western boundary of Sind. Common in the Khyber Pass, and generally in the low arid mountains of Eastern Afghanistan; also in masses up to 5,000 feet in Beloochistan and Mekran.

It is a most useful plant to the inhabitants of the places where it is found. The young leaf or "cabbage" is eaten. Matting, superior to that of the date leaf, sandals, rope,

fans, baskets, and brooms are made from the leaves; while the stem, petioles, and leaves serve as fuel.

The reddish moss-like wool of the petioles is used as tinder, after being steeped in the juice of Mulberry leaves, or impregnated with saltpetre. Bellew also mentions that the delicate young leaves, which have an astringent sweet taste, are in great repute in the treatment of diarrhœa and dysentery, also by cattle doctors. The seeds are exported to Muscat and Gwadur to be manufactured into rosaries for pilgrims *en route* to Mecca.—(*Brandis For. Flo., Dr. Stewart, Dr. J. Stocks.*)

Lodoicea seychellarum, *Lab.*; *Rumph. Herb. Amb.* *The Sea Cocoa-nut.*

Linn. Syst. *Diœcia Monadelphia.*

The fruit or kernel.

Vernacular—Durya Narul, *Hind., Dec., Sind*; Cocos de mer, *Fr.*

A native of the Seychelles or Mahe Island, growing to 90 feet in height. The shell of the nut is said to be used as a drinking cup by Indian devotees, and is supposed to have the power of counteracting the effects of poison. The Vytians occasionally prescribe the kernel in woman's milk, in cases of typhus fever. It is also reputed anti-scorbutic and anti-venereal.—(*Lindley, Ainslie.*)

ALLIANCE 11. *NARCISSALES.*

N. O. 46. AMARYLLIDACEÆ,—*AMARYLLIDS.* Lind.—Bal. N. O. 237.

Crinum asiaticum, *Willd. ii.* 45. *Var, toxicaria.* *Poison Bulb.*

Linn. Syst. *Hexandria Monogynia.*

Vernacular—Sookdurson, Kummoor, *Hind., Beng.*

A native of Malabar, Java, Ceylon and America. Found in humid localities in Bengal, Concan and other parts of India. Cultivated in gardens as a lily. The bulbous root has an unpleasant odour, and is said to be an efficient emetic, and a good resource in cases of need when ipecacuanha is not at hand. The leaves bruised and mixed with castor oil are said to be useful in whitlows and local inflammations. The juice of the leaves is employed in the cure of ear-ache in Sind and Upper India. Rumphius, who calls it *radix toxicaria*, speaks highly of its virtues in curing the disease occasioned by the poisoned arrows of the Macassars in their wars. It is the *Man-sij-lan* of the Cochin Chinese, and its virtues are lauded by Loureiro in his Flo. Cochin China.—(*Pharm., Roxb. Fl. Ind.*)

N. O. 47. IRIDACEÆ,—*IRIDS.* Lind.—Bal. N. O. 236.

Iris florentina, *Linn.*; *Bot. Mag.* 671. *Florentine Iris.*

Linn. Syst. *Triandria Monogynia.*

The root. Orris root.

Vernacular—Irsa, Sosun, *Hind.*; Beg-bunuphsha, *Pers.*; Ussul-us-sosun-ul-asman Joonee, *Arab.*

The plant under notice yields the Iris or Orris root of commerce, which is collected chiefly near Florence and Leghorn, and sent to other parts of the world, and finds its way to India, where it is called *Beg Bunuphsha.* It has a pleasant violet-like odour, a bitterish acrid taste, contains much fecula, with an acrid volatile oil. Distilled with water, a solid crystalline substance is found floating on the aqueous distillate. It is chiefly used in dentifrices and in perfumery. The French use it to make issue peas. It is a favorite medicine with the Persians, who suppose it to have deobstruent and depurative powers. According to Endlicher the purple flowers of *Iris germanica* and *sibirica* treated with lime furnish a green color (hliengrun), much used by artists.

Crocus sativus, *W.* *Saffron Crocus or Meadow Saffron.*

Linn. Syst. *Triandria Monogynia.*

The stigma. Saffron.

Vernacular—Kaysur, Zafran, *Hind.*, *Dec.*; Karkum, Zafran, *Pers.* The CARCOS (calmet) of the "Song of Songs" of Solomon and the KROKOS of Homer.

Allioni affirms that this species is indigenous in Savoy; but Ray says nothing is certain of its native country (*Loudon*). Dr. Royle in his *Mat. Med.* states it is imported from France and Spain, a little from other parts of Europe, and some from Bombay; which must be the produce of Kashmere and Persia. That it is grown in Kashmere is confirmed by Dr. Stewart in his *Punjab Plants*, who mentions it as growing only so far as in one small tract at Pampur, not far from the capital, and that it is imported both to the South and North from there. Honigberger states it is monopolised by the Kashmerian Government, and that the hakeems of the Punjab use saffron in melancholia, typhus fever, enlargement of the liver, and retention of urine. Saffron is much used as a condiment in India and as a coloring agent. To women, after the pains of child-birth, an infusion of saffron is frequently administered by Tamil midwives to prevent fever, to support the spirits, and to assist in carrying off the lochia. In ophthalmia, when mixed with pounded *Chebulic myrobalan* and lemon juice, and applied round the eyes, it is very serviceable. To enumerate all the good qualities which have been ascribed to saffron would occupy too much space; Galen however thought less favorably of it, and believed it to affect the mental faculties, a result which DeCandolle considers analogous to that produced by the petals of certain odorous flowers. Boerhaave supposed it to have the power of dissolving the blood, and, properly administered, to be a valuable "aromatic pectoral, anodyne, hypnotic and alexiteric," adding that when applied to the forehead it sometimes removed frenzy. Its peculiar coloring principle is named *Polychroite*. This is totally destroyed by the action of the solar rays; a small quantity will color a large body of water, and yield blue and green tints when treated with sulphuric and nitric acid, or with sulphate of iron. In modern practice saffron is considered stimulant and antispasmodic, but is little used except as a coloring ingredient. In India it is much prized by native cooks and confectioners. A strong infusion of saffron is said to kill dogs in four or five days; they do not appear to suffer, but gradually sink without pain.—(*Loudon, Lindley, Dr. Stewart, Ainslie.*)

ALLIANCE 12. *AMOMALES.*

N. O. 49. ZINGIBERACEÆ,—*GINGERWORTS.* Lind.—Bal. 233.

Alpinia galanga, *W.* *Loose-flowered Alpinia.*

Linn. Syst. *Monandria Monogynia.*

The root.

Vernacular—Pankejur, *Dec.*; Koolinjun, *Hind.*; Pan-pard, *Sind.*

The greater and lesser galangal are supposed to be the produce respectively of *Alpinia galangal* and *A. chinensis*; both natives of countries east of Singapore, whence they are imported into India, and find a place in the native Materia Medica, under the name of *Koolinjun*. Like the zedoaries they have long since been discarded in European practice; they possess no properties which are not possessed in common by ginger, and are sometimes substituted for that article. The *lesser* galangal, which is the *Lanquaskitsjil* of the Malays, besides being more warm and fragrant than the *greater*, is more highly prized in native practice as a stimulant and stomachic; and may be distinguished by its color; the outside being browner and the inside reddish; whilst the greater galangal root is brownish outside, and a dirty white within, covered with rings about one-fourth of an inch distant. Both galangals are used by native doctors in cases of dyspepsia, and are considered useful in coughs, given as an infu-

sion. An inferior kind of galangal is obtained from *Alpinia pyramidata, Bl.* and *Allughas*, with which are often mixed *Alpinia nutans* and *Kaempferia galanga.* The seeds of many partake of the properties of the root, and are largely prescribed by hakeems in cases of dyspepsia, fevers, rheumatism and catarrhal affections. Irvine (*Med. Topog. of Ajmeer*, page 171) mentions that the natives add koolinjun root to bazaar spirit with the view of rendering the liquor more intoxicating.—(*Ainslie, Lindley.*)

Zingiber officinale, *Roxb.* *Narrow-leaved Ginger.*

Linn. Syst. *Monandria Monogynia.*

The rhizome dried.

Vernacular—Soont, Sookhee Adruk, *Hind., Dec.* The fresh Rhizome, Adhruka, *Hind., Dec.*; Adhoo, *Guz.*; Zunjbel, *Punj.*

The ZIGGIBERIS of Dioscorides, and the ZINGABIL of the Arabs, seems to derive its name from the Sanscrit *Shrinjaveram.* Ginger has been known in India from the remotest times. As a spice it was used among the Greeks and Romans, who appear to have received it by way of the Red Sea, and considered it the production of Southern Arabia. Its native place is not known; but it has been introduced into most tropical countries; and is now found in the West Indies, Tropical Africa, South America, and in Australia. It is cultivated in all the warmer parts of Asia, and in the Himalayas up to 6,000 feet. Several kinds, distinguished partly by place of growth, and partly by quality, are known in commerce; as the Jamaica, Barbadoes, Malabar, Bengal, Tellichery, Cochin, &c. the coated, uncoated, black, bleached or washed, &c. All these possess a similar property of pungency and acridity; and are used as an agreeable aromatic and stomachic, errhine, and sialagogue. In flatulence and spasmodic affections of the bowels, ginger is very much used either in powder, tincture or syrup. It also acts favorably as an external application for headaches. A conserve is made of it, and it is in general favor as a condiment. Ginger consists of lignin, starch, gum, bassorin, extractive, a yellow acrid volatile oil, and some soft and very acrid resin.—(*Birdwood, Lindley, Loudon, Pharm., Pereira, Royle, Dr. Stewart, Garrod.*)

Curcuma longa, *Linn.* *Long-rooted Curcuma.*

Linn. Syst. *Monandria Monogynia.*

The rhizome, turmeric.

Vernacular—Huldoe, *Hind., Beng.*; Hullud, *Dec.*; Uruk-us-Safr, *Arab.*; Kurkum, *Pers.*; Haridra, *Sans.*

Extensively cultivated all over India: in the Punjab, Siwalick tract, and outer hills from 2,000 to 4,000 feet and sometimes to 5,500 up to the Ravi, and occasionally beyond. It is extensively used as a condiment by natives, and also as a dye. It is given by native doctors in the diarrhœas which are so troublesome and difficult to subdue in atonic subjects. In Java it is celebrated for its supposed virtues in facilitating child-birth, in mesenteric obstructions, and in certain complaints of the urinary passage. Burnt over a lamp, and the smoke inhaled through the nostrils, it is said to be serviceable in colds. It has also been employed for cleansing foul sores. It serves as a test to detect the presence of alkalies in excess, which change its color to reddish brown. Turmeric contains starch, a yellow-coloring matter, and an odorous acrid volatile oil (curcumin).—(*Birdwood, Pereira, Lindley, Royle, Pharm.*)

Curcuma zedoaria, *Roxb.* *Round-root Zedoary.*

Linn. Syst. *Monandria Monogynia.*

The rhizome.

Vernacular—Junglee-hullud, Amba-hullud, *Dec.*; Zerambad, *Arab.*; Kakhur Kachoora, *Dec., Guz., Hind.*

A native of Bengal and China. Common in many parts of India. Its roots constitute the *Ban* or *Junglee Huldi* of the Hindostan Mat. Med. Employed by native practitioners as a stomachic; also applied to bruises and sprains.

ALLIANCE 13. *ORCHIDALES.*

N. O. 52. ORCHIDACEÆ,—*ORCHIDS.* Lind.—Bal. N. O. 230.

Eulophia vera, *Royle.*

Linn. Syst. *Gynandria Monandria.*

The root. Salep.

Vernacular— Salep-misree, *Hind., Dec., Pers.*

The nutritious substance called salep is prepared from the subterraneous succulent roots of *Orchis mascula* and many others of the ophreous division, and in India from the species under notice. It consists almost entirely of a chemical principle called "Bassorin." *E. campestris, E. herbacea* and *E. vera* (Royle) are species found in India. Dr. Stewart says the first is found in Oude and Rohilkund, and in the Sewalicks of the Gangetic Doab, and he believes he found it in low land by the Ravi close to Lahore; the second in Southern India and the outer Himalayas near the Jumna; and the third near the Jhelum river in the Punjab and in the Himalaya. The best kinds of salep are said to come from Afghanistan and Kashmere By the natives salep is chiefly esteemed as a tonic and aphrodisiac. It is said by Royle to be a nutritious and unirritant diet for the sick, convalescent, or children, boiled with water or milk, and flavored just as sago and other farinaceous foods.—(*Lennep's Travels in Asia Minor, Lindley, Dr. Stewart, Royle.*)

ALLIANCE 14. *XYRIDALES.*

N. O. 56. COMMELYANACEÆ,—*SPIDERWORTS.* Lind.—Bal. N. O. 248.

Commelyna bengalensis, *Forsk.*; *Roxb. Fl. Ind. i. p.* 171.

Linn. Syst. *Triandria Monogynia.*

Vernacular—Kanshura, *Hind.*; Choora, *Punj.*; Khanna, *Sind.*

A creeping annual; leaves alternate, petioled, ovate, obtuse or cordate, slightly pubescent; petioles ciliate; spathes terminal in fascicles; flowers blue; calyx 3-leaved; petals 3; filaments 3-4; capsules 2-3-celled. 2-seeded; embryo simple, anatropal, in a cavity of the fleshy albumen.

Sind, Arabia, Punjab plains in the Salt Range, and in the outer hills to 6,000 feet, Bengal and Deccan.

The leaves of this plant are eaten by the very poor classes of natives.

N. O. 59. ORONTIACEÆ,—*ORONTIADS.* Lind.—Bal. 258.

Acorus calamus, *W.*; *Rheede Mal.* 11. *t.* 48; *Roxb. Fl. Ind. ii. p.* 169. *Sweet Flag.*

Linn. Syst. *Hexandria Monogynia.*

The root. Sweet flag.

Vernacular—Buch, Gor-bach, *Hind., Sind, Punj.*; Yakund, *Dec.*

Employed generally in native practice in Sind in cases of flatulency, chronic catarrh, dyspepsia and rheumatism. In the cure of this last the rhizomes are boiled in malkungnee oil to be used as a liniment. The fruits of *Scindaspus officinalis* (Schott). Guj—piplee—is prescribed as a diaphoretic.

ALLIANCE 16. *LILIALES.*

N. O. 62. LILIACEÆ,—*LILYWORTS.* Lind.—Bal. N. O. 242.

Asphodelus fistulosus, *Linn.*; *Asphodelus clavatus, Roxb. Fl. Ind. ii. p.* 149. *Onion-leaved Asphodel.*

Linn. Syst. *Hexandria Monogynia.*

The seeds and plant.

Vernacular—Piazee, Bokhat, Binghar-beej, *Punj., Sind.*

Annual; stem naked, ramous; leaves erect, linear, cylindric, fistulous, tapering to a point; scape erect, branched; flowers small, white with a brownish line running along the centre; filaments ciliate, contracted; corol 6-partite; stigma capitate; ovary 3-celled.

Abundant as a field weed in Sind, Kutch and Punjab plains; also in the Deccan and Bengal.

It is eaten as a vegetable in times of famine, and appears to be the plant which, near the Bolan Pass, Griffith describes the camp followers as eating, when the provisions of the Kandahar force ran scarce.—(*Dr. Stewart.*)

Polianthes tuberosa, *W.*; *Bot. Mag.* 1817; *Amica nocturna, Roxb. Fl. Ind. ii. p.* 166. *Common Tuberose.*

Linn. Syst. *Hexandria Monogynia.*

The seed.

Vernacular—Goolshabbo, *Hind.*; Runjuni, *Beng.*

This plant is a native of Java, Ceylon and India, and is largely cultivated in some parts of Italy, whence the bulbous roots are annually sent to England. It is much prized for the delicious fragrance of its flowers. It is commonly cultivated in gardens for their sake. Medicinally the bulbs are said to be dried, powdered and administered in gonorrhœa.—(*Lindley, Ainslie, Dr. Stewart.*)

Aloe socotrina, *Haw.*; *Roxb. Fl. Ind. ii. p.* 147; *Bot. Mag.* 1474. *Socotrine Aloe.*

Linn. Syst. *Hexandria Monogynia.*

The inspissated juice of the plant. Aloes.

Vernacular—Aylia, Ayria, *Hind., Dec.*; Seeb, *Sind*; Gheekoomwar, *Beng.*

The aloes or socotrine of commerce is the bitter, inspissated juice of the leaves of *Aloe littoralis, vulgaris, purpurascens, spicata* and *barbadense,* which some consider as not being specifically different.

The commercial kinds are mentioned as being—1st Socotrine, Turkey or extract of spiked aloes, from *A. socotrine,* and probably also *A. purpurascens* (Hawula); 2nd, genuine hepatic, Bombay or East Indian aloes from the Island of Socotra; 3rd, Barbadoes aloes from *A. vulgaris*; 4th, Cape and Caballine aloes from the several Cape of Good Hope species; 5th, the round cakes from Jafferabad, not noticed in any European work, being probably *A. littoralis.* The pulp of *A. perfoliata* and *A. indica,* after removing the outer pellicle, is eaten sweetened with sugar by natives as a demulcent. The same purified, and with the addition of a little burnt alum, is employed as a remedy in ophthalmia.

Asparagus officinalis, *Willd. ii. p.* 150; *Roxb. Fl. Ind. ii. p.* 151. *Officinal Asparagus or Chard.*

Linn. Syst. *Hexandria Monogynia.*

Vernacular—Hilyoon, *Hind.*; Margya, *Beng.*

Dr. Honigberger mentions that the hakeems use the seeds of this species in debility of the stomach, also in liver, spleen and renal disorders. They also attribute to them diuretic and aphrodisaic properties.

The use as an esculent of the young stems is well known, and they are sold in some of the bazaars of our Indian towns, raised from imported seed.

Asparagus satawur, (*Adscendens*). *Roxb. Fl. Ind. ii. p.* 154.

Linn. Syst. *Hexandria Monogynia.*

The root.

Vernacular—Satrawul, Khyrao, *Hind.*, *Beng.*

A shrubby climbing plant found in Cochin, Travancore and other parts of India. An infusion of the roots is said to have been successfully employed in the first stages of small-pox. Its root is exported to the plains and is considered tonic and astringent, and also thought to resemble salep in its effects. In Kanawur a sprig of this plant is put in the hands of small-pox patients as a curative measure.—(*Lindley, Dr. Stewart, Ainslie.*)

Asparagus sarmentosus, *Willd. ii. p.* 152. *Linear-leaved Asparagus.*

Linn. Syst. *Hexandria Monogynia.*

The root.

Vernacular—Suffaid Mooslie, *Hind.*; Eilora, *Sind.*

A shrubby scandent plant indigenous in India, the flowers of which perfume the air to a considerable distance with their delightful fragrance. Dr. Irvine, in his *Medical Topography of Patna*, states that the roots of this plant are sold in the bazaars there as *Atees.* This statement is borne out in the *Beng. Disp.* p. 168, and in a report by Dr. R. F. Hutchinson. Ainslie and Graham state that the roots are often candied, and in that state they are occasionally brought from China. Boiled in milk like salep, natives consider them nourishing and possessed of aphrodisaic properties.—(*Roxb.*, *Ainslie.*)

ALLIANCE 17. *ALISMALES.*

N. O. 66. JUNCAGINACEÆ,—*ARROW-GRASSES.* Lind.—Bal. N. O. 253.

Potamogeton pectinatum, *W.*; *Roxb. Fl. Ind. i. p.* 452. *Fennel-leaved Pondweed.*

Linn. Syst. *Tetrandria Tetragynia.*

Vernacular—Jhala, Phas, *Sind.*

An aquatic perennial; stems creeping or floating according to depth of water; leaves alternate, petioled, narrow lanceolate, setaceous, approximated in two rows; petioles simple, shorter than the leaves; flowers small, greenish; calyx O.; petals fleshy, long; filaments O.; anthers four pairs; germs ovate, four, 1-celled.

Common in ponds, tanks and swamps in Sind and the Punjab, also in the Deccan. At Kurrachee in "One Tree Tank."

P. natans, *W.*; *Gærtner, vol. ii. p.* 184. *Broad-leaved Pondweed.*

Linn. Syst. *Tetrandria Tetragynia.*

Vernacular—Phas, *Sind.*

Leaves sessile, alternate, broad, elliptical, stalked, floating, coriaceous, marked with green longitudinal veins; lower leaves submerged, long and narrow.

One Tree Tank' at Kurrachee and in the tanks at Joongshai.

Class V. Dictyogens.

ALLIANCE *SAME AS CLASS.*

N. O. 69. SMILACEÆ,—*SARSAPARILLAS.* Lind.—Bal. 225.

Smilax china, *W.* *Chinese Smilax.*

Linn. Syst. *Diœcia Hexandria.*

The root. China root.

Vernacular—Chobo Cheenee, *Hind.*, Paringay.

A woody, thorny, climbing shrub. native of China and Japan, also of Eastern India, Nepaul, Sikhim and Assam. The bark of this plant is said to abound in fecula, and to be in consequence used as a demulcent. Both the bark and root are largely imported into India from China, but are seldom found in the bazaars in any but a worm-eaten state. The roots are long, fleshy, twisted, full of knots, and flesh colored. A decoction of these is said to be possessed of virtues equal to Sarsaparilla. Roxburgh informs us that the large tuberous rhizomes of *S. lancifolia* (also that of *S. glabra*) are much used by natives, and are not to be distinguished from China root. The juice of the fresh tuber is taken for the cure of rheumatic affections, and the refuse, after extraction of the juice, is laid over the suffering parts. In venereal cases of long standing it is supposed to have considerable efficacy.—(*Lindley, Loudon, Pharm. of Ind., Roxb. Fl. Ind., Pharm.*)

Class VI. Gymnogens.

ALLIANCE *SAME AS CLASS.*

N. O. 74. PINACEÆ,—*CONIFERS.* Lind.—Bal. N. O. 220.

Pinus gerardiana, *W.* *Neoza or Edible Pine.*

Linn. Syst. *Monœcia Monadelphia.*

The nuts.

Vernacular—Chilgoza, Gunober, *Hind.*; Neoza, *Punj.*; Kashti, *Afghanistan.*

Common in North Afghanistan and Kafristan, also on the Sufaid Koh, and at high elevations on the Suliman range. It is common in a part of the Upper Sutlej basin, at one spot on the Ravi, and on a small portion of the Upper Chenab and its tributary the Marroo (5,800–8,000 feet). It is also reported by Falconer and Winterbottom as growing near Astor and Gilghit, not far from the Indus. Its range in the Punjab Himalaya may be stated at from 5,800 to 8,800 feet. The wood being resinous is used for torches and fuel; a white resin also exudes from the bark and cones, but is not much used. Excellent tar is said to be obtained from the wood by destructive distillation. The chief product of the tree is the seed, of which there are above a

hundred in a full-sized cone. The nuts are extracted from the unopened cones by heating, and large quantities are stored for winter use, forming the staple food of the inhabitants of Kunawur, ground and mixed with flour. They are as sweet as almonds, with a slight but not unpleasant turpentine taste. An oil extracted from them is used medicinally, and held in repute among natives in N. W. India for its stimulant properties and power of healing ulcers.—(*Brandis, Cleghorn, Dr. Stewart, Royle.*)

Pinus longifolia, *W.* *Long-leaved Pine.*

Linn. Syst. *Monœcia Monadelphia.*

The resin.

Vernacular—Gunda-biroza, Chir-ka-gond, *Hind.*; Birozeh, *Tur.*, *Pers.* The tree, Chir, Nashtar, *Punj.*; Sarala, *Sans.*; Kolan, Gharwal.

A native of the Himalayas, cultivated at Kandahar up to 3,500 ft., Kafristan 6,000 feet, and the Eastern slopes of the Suliman range. Abundant in the Siwalik tract and outer Himalaya from the Indus to Bhootan; generally between 1,500 and 6,000 feet elevation, rising occasionally higher to 7,500 feet in Kamaon. In the Punjab north of the Sutledge, 1,800 feet is generally regarded as the lowest, and 5,000 feet as the upper limit of this tree. In Simla it grows as high as 7,000 feet, and this is generally its upper limit in Kamaon. The bark in many places is employed by tanners, and Madden states that in Kamaon it is much employed as fuel for smelting iron. In parts of the Jhelum Basin the turpentiny seed is at times eaten when food is scarce, but it cannot be pleasant, and is probably not a nutritious food. The resin procured by incision is more largely collected and used than that of any other of the Himalayan conifers; but this is detrimental and ultimately destructive to the tree. Purified and unpurified, it is used internally as a stomachic, and externally as a plaster. It is sometimes employed in coating timber which is to be exposed to water. Oil of turpentine is extracted from it, but the practice was probably introduced by Europeans, as has been that of extracting tar from the wood, by destructive distillation.—(*Brandis, Dr. Stewart, Cleg. Punj. Report, Agri. Hort. Rep., Royle.*)

Juniperus communis, *Linn.; Willd. iv.* 853; *Roxb. Fl. Ind. iii.* 839; *Brandis, For Fl.* 535. *Common Juniper.*

Linn. Syst. *Diœcia Monadelphia.*

The berries.

Vernacular—Billar, Purpinjur, *Hind.*; Howbare, *Hind.*; Hoobul, *Pers.*; Ahoober, *Sind*; Pethra, Betar, *Kashmir.*

A densely ramous shrub or dwarf tree; trunk short; leaves linear, ternate, spreading, sharp-pointed, about ½ inch long; catkins axillary, supported by bracts, the male ovoid; antheriferous scales broad-ovate; female flowers small; berry 3-seeded, subglobose, on short stalks, sweet-tasted.

Common on the hills in Sind from 4,000 to 6,000 feet on the high peaks of the Kirthur or Halla mountains, and in the Punjab and the Himalaya from 7,000 to 13,000 feet, often forming a belt, or patches above arboreal limit.

The berries were known to the Greeks, by whom, and by the Romans and Arabians, they were used in medicine. They are globular, marked with three radiating furrows at the summit, and below by bracts; of a purplish black color with a glaucous shade containing a brownish-yellow pulp; smell strong but not disagreeable, with a warm pungent sweet taste, succeeded, if long chewed, by a bitterish one. The chief constituents of the berries are an essential oil and a sweet mucilaginous matter. Their properties are partly yielded to water, and very readily to alcohol. The oil distilled from the fruit is colorless or pale greenish yellow, nearly approaching that of oil of turpentine. It is considered useful as a stimulant diuretic, but rarely employed in modern practice. The peculiar flavor and well-known diuretic effects of "Hollands" are due to it. The

essential oil permeates all parts of the plant, and an infusion of the tops or roots may be used as a diuretic. The wood is officinal on the Continent and in the Punjab. In the latter place it is used as firewood, as also on the high passes, where it is the only procurable fuel. On the Sutledge and the Bias, and in Sind to a small extent, the twigs are used as an incense in temples.—(*Lindley, Loudon, Dr. Stewart, Brandis, Royle, Roxb., Edin. Disp., Supp. to Edin. Disp., Pereira, Pharm., Birdwood, Garrod's Mat. Med., Cleghorn's Punj. Rep.*)

Callitris quadrivalvis, *Rich.; Lod. Bot. C.* 844. *Thuja articulata, Vahl.*

Linn. Syst. *Monœcia Monadelphia.*

The resin. Sandarach.

Vernacular—Sandaras.

This is a small tree of Western and North Africa, remarkable on account of its compact heavy and very fragrant heartwood, which has a rich brown color, and takes a beautiful polish. From this tree a strongly scented resin (sandarach) exudes—a whitish-yellow, brittle, inflammable substance, with an acrid aromatic taste. It is said by Thomson to be an exudation from the *Juniperus communis*, but on the authority of Brongniart and Schousboe, it is the "tears" of the plant under notice and the *Sandaracha arabum* of old writers. The powder of Sandarach is sometimes used instead of "pounce," and is an ingredient in varnishes, and with other gum resins, &c., is used by natives as a fumigatory after childbirth.—(*Brandis, Lindley, Birdwood.*)

N. O. 76. GNETACEÆ,—*JOINT-FIRS.* Lind.—Bal. 208, 210, 211, 212 and 213.

Ephedra alata, *Dne.; Brandis, For. Fl.* 501.

Linn. Syst. *Diœcia Monadelphia.*

Vernacular—Bandukai, Lastuk, Nangurwal, *Punj.*; Asmanee, *Hind.*

A large shrub 6–8 feet high, with spreading erect branches; leaves whorled; branchlets hispid; sheath joints bifid, acuminate; male catkins clustered, sessile or stalked; female solitary, stalked; fruit ovoid.

Common in the plains of the Punjab and Sind. In the salt range ascending to 2,500 feet, found also on the hills and plains of Beloochistan, Afghanistan, and Persia. Dr. Stewart says this may be the *Ephedra* of Griffith, used for snuff, near the Khyber Pass. The branches and flowers are considered styptic, and the fruit is said to be mucilaginous, edible, subacid and slightly pungent.—(*Cleghorn, Brandis, Dr. Stewart.*)

Class VII. Exogens.

ALLIANCE 18. *AMENTALES.*

N. O. 77. CASUARINACEÆ,—*BEEFWOODS.* Lind.—Bal. 213.

Casuarina equisetifolia, *W.; Bot. Cab.* 609. *Horse-tail Casuarina.*

Linn. Syst. *Monœcia Monandria.*

The bark.

Vernacular—Jooreejur, Mujjun, *Sind.*

A large diœcious tree, with leafless drooping branches, thickly set at the ends with numerous slender articulate branchlets, hanging in bunches from 12 to 18 inches in length, serving as leaves. It is a native of Chittagong, and is also found in Burma,

and the Islands of the Archipelago. Introduced into India in the beginning of this century, it is now well established in all parts from the Punjab to Ceylon and Singapore.

The bark is slightly astringent, and said to be employed in infusion as a tonic, and according to Dr. Gibson is an excellent and often readily available astringent in the treatment of chronic diarrhœa and dysentery. It is also used as a dye in Pondicherry. —(*Loudon, Lindley, Brandis, Roxb., Ainslie.*)

N. O. 78. BETULACEÆ,—*BIRCHWORTS.* Lind.—Bal. 211.

Betula bojputtra, *Wall. B. Jacquemontii, Spach; Jacq. Voy.*

Linn. Syst. *Monœcia Tetrandria.*

The bark.

Vernacular—Bhojputtra, *Hind.*; Burzal, Phurz, *Punj.*

Common in the higher ranges of the Himalaya, extending far into the inner arid tract in the Punjab, where it is found abundantly at from 7,000 to 11,500 feet; in Sikhim and Bhootan not under 9,500 feet, ascending to 11,000, and often to 12,000. It also occurs on the borders of Western Thibet and Sikkim up to 14,000 feet. The bark is the most valuable part, being used by the mountaineers—as it was by the Hindoos, in the beginning of the Christian era, or as late as the age of the Dramas,—instead of paper for writing on. In Kashmere and Kamaon it is found a very durable thatch under earthen roofs, and is largely used for covering umbrellas, and packing fruit and other articles exported to the plains. It is used by the Hindoo pilgrims of Kashmere at the shrines of Umrnath in religious ceremonies, and in Kangra for funeral piles.—(*Brandis, Dr. Stewart, Royle.*)

The bark of the Black Birch is valuable for its aromatic antiseptic properties. It is used in the preparation of Russia leather, as is also the rectified oil obtained by distillation.

N. O. 80. SALICACEÆ,—*WILLOWWORTS.* Lind.

Salix tetrasperma, *Rox. Corom. pl. i. 97; Roxb. Fl. Ind. iii. 754.*
Four-seeded or Indian Willow.

Linn. Syst. *Diœcia Diandria.*

Vernacular—Baishee, *Hind.*; Boorum, *Sans.*; Panee Jooma, *Beng.*; Badha, *Punjab*; Wullung Bacha, *Bombay*; Beetsa, Badha, Sufaida, *Sind.*

A small but elegant tree, 20–25 feet high, with ramose branchlets; leaves alternate, short-petioled, elliptic, lanceolate, pointed, serrulate, glabrous, glaucous beneath; stipules leafy; catkins lateral, peduncled, following the leaves; peduncles 3–6 leaved; male catkins long, drooping, few flowered; female elongated, cylindric; scales small, cup-shaped, spathulate; stamens about 6; capsule cordate, 1-celled, 4-seeded.

Planted in Sind and the Punjab; cultivated in Afghanistan; common in the Sub-Himalayan tract and outer ranges of the Himalaya; west of the Indus ascending to 6,000 feet; also in the vale of the Yena and other moist places, Mahableshwur, and in various parts of the Southern Mahratta Country.

The twigs and branchlets are used for basket-making and fences, also as firewood. The wood is tough, but little used. A cubic foot weighs 35 lbs. Sp. Gr. ·560.

The bark, according to Dalzell and Gibson, is said to be a good febrifuge. From the flowers of *Salix capræ* and *ægyptiaca* is distilled an aromatic water, said to possess valuable stimulant properties, and to be held in high repute in various diseases.

Salix acmophylla, *Boiss.*; *D. C. Prod. xvi.* 195 *Brandis, For. Flo* 463.

Linn. Syst. *Diœcia Diandria.*

Vernacular—Bedh, *Afg.*; Budha, *Sind*; Beesoo, *Punjab.*

A moderate-sized tree with lax branches; leaves linear, lanceolate, glabrous, hoary beneath; catkins following the leaves, peduncled; scales of the catkin single-flowered, imbricated; both male and female catkins nodding, 1–2 inches long; stigmas 2.

Common in Upper Sind; on the borders of Afghanistan, Persia and N. W. Himalaya.

Leaves used as fodder; wood like the last, tough and elastic. Used for small carpentry. Weight 37 lbs. to the cubic foot. Sp. Gr. ·602.

Populus euphratica, *Oliv.*; *D. C. Prod. xvi. ii.* 326. *Brandis, For. Flo.* 474.

Linn. Syst. *Diœcia Octandria.*

Vernacular—Sufaida, Bhan, *Sind*; Sufaidar, Junglee Bentee, *Punj.*; Putkee, Brahooee.

A large tree 40–50 feet high, with often a girth of 8 feet; leaves alternate, petioled and varying in shape and size, coriaceous, generally roundish cordate or ovate; lower leaves broad, dentate, lobed or deeply and irregularly serrate on top, upper leaves ovate-lanceolate; catkins 3 to 6 inches long, nodding; capsule alternate, pedicelled, opening into three valves.

Common in Sind along the banks of the Indus, more so in upper than lower Sind, attaining a girth of from 7 to 8 feet, also in Southern Punjab, Beloochistan, and Afghanistan.

The coppice shoots of this tree are used as rafters, and the timber for beams, planks and turnery. The lacquered boxes made in Sind are of this wood A cubic foot weighs 38 lbs. Sp. Gr. ·609. In Sind and the Punjab the bark is given as a vermifuge. The twigs are used as tooth-brushes by the natives.—(*Dr. Stewart, Brandis.*)

N. O. 81. MYRICACEÆ,—*GALEWORTS.* Lind.—Bal. 208.

Myrica sapida, *W.* *Box Myrtle.*

Linn. Syst. *Diœcia Tetrandria.*

The bark.

Vernacular—Kaiphul, *Hind.*, *Sind.*

Occurs in the outer ranges of the Himalaya. Within Punjab limits it is by no means common. The fruit is about as large as a cherry, and according to Buchanan is pleasantly acid and edible. The bark (kaiphul) is officinal both in Sind and the Punjab, being considered hot, and internally given in rheumatism. Compounded into a plaster it is applied to ulcers. It forms an export to Patna and the low countries, where it enjoys much repute as an aromatic stimulant, and is used as a rubefacient and sternutatory. Dr Irvine (*Med. Top. of Ajmere*, p. 140) states that he has found kaiphul and ginger mixed, the best substance with which to rub cholera patients.—(*Brandis, Pharm. of Ind., Dr. Stewart, Lindley.*)

N. O. 82. ELÆAGNACEÆ,—*OLEASTERS.* Lind.—Bal. 183.

Elægnus conferta, *Roxb. Fl. Ind. i. p.* 440.

Linn. Syst *Tetrandria Monogynia.*

The seeds and flowers.

Vernacular—Gawai, Kunkoe, *Hind.*

Occurs in the Himalaya, Kamaon to Bhootan, Sylhet, Burmah, Ceylon and South India. The fruit is eaten in Kashmere, and Griffith states it is also used medicinally. According to Thomson the tree supplies most of the winter fuel of the people of Iskardo. The flowers are official both in Sind and the Punjab, being considered cardiac and astringent.—(*Dr. Stewart, Roxb.*)

ALLIANCE 19. *URTICALES.*

N. O. 86. CANNABINACEÆ,—*HEMPWORTS.* Lind.—Bal. 199. *Urticaceæ.*

Cannabis sativa, *Willd. iv. p.* 768; *Roxb. Fl. Ind. iii. p.* 273. *Common Hemp.*

Linn. Syst. *Diœcia Tetrandria.*

The herb and resin.

Vernacular—Bhang, Goor, Phoolganja, Gunja, Churrus, *Hind., Dec.*; Kinnub, *Arab.*

An annual of Western and Central Asia, cultivated in temperate as well as in tropical countries. It is found in Kashmere, the Punjab plains, *Cis* and *Trans* Indus, also in many places in the Himalaya up to 10,000 feet. It is grown in Sind, and Dr. Stocks states that, if ever it should be found advantageous to grow it for its fibre, Sind would be a very proper climate. The resinous exudation does not appear to be produced below a certain elevation. The dried flowering tops of the female plant from which the resin has not been extracted is the *Gunjah,* so largely used for smoking throughout India. The three principal forms in which Indian hemp is met with in India are—1, *Ganja,* the dried flowering plant from which the resin has not been removed; 2, *Churrus,* the resinous exudation from the leaves, stems and flowers; and 3, *Bhang, Subzee* or *Sidhee*—the larger leaves or capsules without the stalks. In addition to these is *Majoon,* a compound of bhang, butter, sugar, flour and milk. The leaves have been analysed, but the analysis requires to be repeated and carefully compared with that of the Indian plant. The properties seem to depend on a volatile oil and resin. The most interesting constituents of hemp, from a medical point of view, are the resin and volatile oil, the former was first obtained in a state of comparative purity by T. and H. Smith in 1846. It is a brown amorphous solid, burning with a bright flame and leaving no ash, has a very potent action when taken internally, —two-thirds of a grain acting as a powerful narcotic, and one-third producing complete intoxication. In tetanus, hydrophobia, delirium tremens, various forms of neuralgia, and other nervous affections, its use has been attended with benefit. In Sind the most celebrated kind of bhang is called *Bubukai bhang,* from the town of Boobuk near Lake Muncher. An infusion is made from the dried leaves and capsules of this plant with milk, sugar, poppy seeds and spices, and drunk by the upper classes; the lower classes satisfying themselves with only the infusion in water, which to those who are by their religious restrictions debarred from partaking of spirits, is a substitute for them. The labouring classes especially indulge very freely in it as beneficial to health. The *gunjah* is smoked like tobacco, either alone, or with tobacco well rubbed down with water and made into a mass. A very singular effect is recorded on very good authority, to have been sometimes produced, by feeding bullfinches and goldfinches on hemp seed alone, or in too great quantity, viz., that of changing the red and yellow of these birds to a total blackness.

The general effects of the resin are alleviation of pain, remarkable increase of appetite, unequivocal aphrodisia, and great mental cheerfulness. Its more violent effects are delirium of a peculiar kind and a cataleptic state —(*Royle, Pharm., Lindley, Loudon, Pharm. of India, Dr. Stewart.*)

N. O. 87. MORACEÆ,—*MORADS.* Lind.—Bal. N. O. 200.

Morus indica, *Willd. iv.* 370. *Roxb. Fl. Ind. iii.* 596 *Mulberry.*

Linn. Syst. *Monœcia Tetrandria.*

The root.

Vernacular—The root,—Toot-lukkur, Sceahtoot, *Hind.*; Toot-jokhul, *Sind.* The fruit, Toot.

Cultivated in Sind, Punjab, Beloochistan and Afghanistan, but Dr. Stewart (*Punjab Plants*) says there is considerable doubt as to the species of *Morus* in the Punjab, and that *M. alba, cashmeriana, indica, lævigata* and *tartarica* appear chiefly on the plains, and some of them on the hills up to Kashmere and to 7,000 feet on the Chenab. Vigne and Thomson mention *M. indica* as growing in parts of Thibet, which is everywhere grown for its fruit, conserves and syrups being made of it and largely eaten. The root is considered a good anthelmintic and astringent. The fruit has an agreeable aromatic and acid flavor, is cooling and laxative, allays thirst, and is grateful in fevers.

The white variety (*M. alba.*) is also common in Sind gardens, and has the same qualities.

Ficus bengalensis, *Linn.*; *Roxb. Fl Ind. iii.* 538. *Banyan or Indian Fig Tree.*

Linn. Syst. *Polygamia Diœcia.*

Vernacular—Wur, Bur, *Hind.*, *Sind*; Burgot, *Dec.*; Vata., *Sans.*; Thaab, *Arab.*

Common in Sind, the Punjab plains, up to 4,000 feet in the hills; Oudh, Central, South and Western India.

This tree is so well known in India that it would be superfluous to describe it. Its immense height and the shade it affords from its spreading branches make it a blessing to the traveller, and a marked feature in Oriental landscapes.

The white viscous juice which exudes from the tender stalks when pricked or bruised, is sometimes applied to the gums to relieve tooth-ache; it is also considered a valuable application to those troublesome cracks on the soles of the feet, to which natives are liable. Birdlime is also prepared from it by them. The bark is given in infusion and supposed to be a powerful tonic; and is also administered in diabetes. The leaves are sewn together and used as plates by the Hindoos, and the wood for door panelling, boxes and small carpentry. A cubic foot weighs 32 lbs. Sp. Gr. ·512.—(*Graham, Ainslie, Dr. Stewart, Dr. Brandis.*)

Ficus religiosa, *Willd. iv. p.* 1134; *Roxb. Fl. Ind. iii.* 547. *Poplar-leaved Fig Tree.*

Linn. Syst. *Polygamia Diœcia.*

Vernacular—Pippul, *Hind.*, *Dec.*, *Guz.*; Pippulla, *Sans.*; Aswurtha, *Beng.*; Bogass, Bogaha, *Cing.*; Pipur, *Sind.*

Too common to require description.

Indigenous in Bengal and Central India, found planted in Sind, Southern and Western India, the Berars, the Circars, Punjab, Ceylon and Burma.

The small whitish seeds of the fruit or fig are supposed to possess cooling and alterative qualities, and are exhibited in electuary. According to Bartolomeo (*Voyage to the East Indies*) the dried fruit, "pulverized and taken in water for a fortnight, removes asthma and promotes fruitfulness in women." The leaves and young shoots are used as a purgative.

The timber of this tree has a flesh-like color, is open grained and unfit for anything except fuel. A cubic foot weighs 45 lbs. Sp. Gr. ·720.

Of this genus also are cultivated in Sind *Ficus carica*, Linn.; and *Ficus virgata*, Roxb. The fruits of both are eaten as dessert and much esteemed as wholesome depuratives. They are said to be used as laxatives in native pharmacy, both fresh and in the dried state. The dried fruit comes to India in large quantities from Arabia and the Gulf, and from the African Coast.

ALLIANCE 20. *EUPHORBIALES.*

N. O. 90. EUPHORBIACEÆ,—*SPURGEWORTS.* Lind.—Bal. 195.

Euphorbia nereifolia, *Willd. ii.* 984; *Roxb. Fl. Ind. ii.* 467. *Oleander-leaved Spurge,* or common "Prickly Pear" of Sind.

Linn. Syst. *Dodecandria Trigynia.*

Vernacular—Thohur, Thoor, *Sind*; Munsa sej, *Hind.*; Thoor, Putteoon-ke-saynd, Newroong, *Dec.*; Gangeechoo, *Punj.*; Vurzee-zuker, *Arab.*; Puttakaree, *Sans.*

A small tree 6 to 8 feet high, with a strong upright stem; trunk of old trees about 10 inches in diameter; branches round, ascending, scattered, five-sided, and somewhat spirally disposed; protuberances oblique to the angles; leaves alternate, short-petioled, oblong, smooth, entire, subsessile on every protuberance or wort and at the top; thorns stipulary, in pairs; peduncles solitary, three-flowered; flowers sessile, greenish-white.

Indigenous in Sind, the Concan and Deccan. The *Euphorbia ligularia* of Rumphius.

The acrid juice of the leaves of this plant is prescribed internally by native practitioners as a cathartic and deobstruent in visceral obstructions and dropsical affections consequent on long continued fever. With margosa oil it is used as an application in rheumatic affections. Loureiro, in his *Flora Cochin China*, observes in speaking of the virtues of this plant, "Emetica purgans, acris nec tuta." On the Western coast the bark of the root boiled in rice water with the addition of arrack is considered useful in dropsy. The juice or milk of the plant enjoys an almost universal repute as a remedy in snakebites, but there is no reliable evidence of its utility in these cases.—(*Ainslie, Lindley, Pharm. of Ind., O'Shaughnessy.*)

Euphorbia helioscopia, *Linn.* *Wartwort.*

Linn. Syst. *Dodecandria Trigynia.*

The plant and milky juice.

Vernacular—Hirruseeah, Mahabi, *Hind.*; Gandabootee, Kulfa-dodakak, *Punj.*

This is a common field weed in spring throughout the Punjab plains and the Siwalick tract, and to 7,000 feet in the outer Himalaya. The milky juice is applied to eruptions, and Honigberger states that the seeds are given with roasted pepper in cholera. It is probably this species, of which, as "common spurge," Bellew mentions that in Afghanistan the juice is used as a liniment in neuralgia and rheumatism, and the root as an anthelmintic.

Euphorbia tirucalli, *Willd. ii. p.* 890; *Roxb. Fl. Ind. ii.* 470. *The Indian Tree Spurge, or Milk Bush.*

Linn. Syst. *Dodecandria Trigynia.*

Vernacular—Sij, Sair, *Hind., Sind.*

Arboreous, unarmed; branches spreading regularly, clustered; branchlets cylindric; leaves linear, sessile, alternate, fleshy, chiefly at the end of twigs; flowers subsessile, terminal and in the forks of the branchlets.

Common in Sind, Deccan, Concans, Guzerat and Cutch. Employed chiefly for hedges around villages and gardens.

The fresh acrid juice is used as a vesicatory, also as an effectual application for the removal of warts; incorporated with any bland oil, it is used in common with the milky juice of other species as a rubefacient embrocation in rheumatism. The dried juice of *Euphorbia royleana*, Bois, (Afarbioon, Sind) is also similarly used.—(*Lindley, Dr. Stewart, O'Shaughnessy.*)

Euphorbia thymifolia, *Willd. ii.* 898; *Roxb. Fl. Ind. ii. p.* 473. *Thyme-leaved Euphorbia.*

Linn. Syst. *Dodecandria Trigynia.*

Vernacular—Hazardhana, Dhoduk, *Sind, Punjab.*

A herbaceous annual; stems procumbent, hairy, dichotomous; leaves serrate, opposite, oval-oblong; flowers axillary, clustered, subsessile; calyx and corolla in four semilateral parts.

Common as a weed in Sind, Punjab, Kutch, Deccan, and Guzerat.

Commonly used as a purgative in Sind. The small seeds and leaves in their dried state are slightly aromatic and astringent and employed by native practitioners in certain bowel complaints of children in conjunction with butter-milk.

Ricinus communis, *Roxb. Fl. Ind. iii. p.* 689; *Bot. Mag. t.* 2209. *Castor Oil Plant.*

Linn. Syst. *Monœcia Monadelphia.*

The seed and oil.

Vernacular—Ayrundee, Ayrund-Kurroo, *Hind.*; Ayrun-Kukree, *Sind.*

Occurs commonly in waste places in the Punjab plains, also in the Thurr and Parkur districts, Deccan, Concan, and Bengal, and is not uncommon up to 3,500, and occasionally 4,000 feet in the Punjab Hills. It is easily raised from seed, but seems to be liable to suffer from frost. Animals are stated to be killed by eating the leaves, and in Harriana they are applied to guineaworm to promote its expulsion. Bellew states that near Ghuzni (7,000 feet) in Afghanistan, the oil is used for domestic and culinary purposes, but Dr. Stewart says he cannot find that in the Punjab it is ever used except medicinally. It is found that the albumen has little activity, and that the virulence resides mainly in the embryo and seed coats; so that the activity of the oil will depend on the amount of pressure to which the seeds may be subjected. When long boiled the oil is found poisonous. If carefully prepared from peeled and winnowed seeds by pressure without heat, the oil has but a slightly nauseous odour and a less acrid taste. It is of a pale straw color, and a mild and efficient purgative, well adapted for children, the puerperal state, and inflammatory conditions of the alimentary canal (when aperients are admissible). The leaves are said to possess considerable power as a lactagogue, warm leaves being applied to the breasts.—(*Birdwood, Pharm., Lindley, Loudon, Dr. Stewart.*)

Mallotus phillippensis, *Mull. Arg. Rottlera tinctoria. Roxb. Fl. Ind. iii.* 827; *Willd. iv.* 823. *Dyer's Rottlera.*

Linn. Syst. *Diœcia Icosandria.*

The powder of the capsules.

Vernacular—Rooin, Roolee, Kumbhul, Wussuntha-gunda, *Hind., Dec.*; Kameela.

A native of the inland mountainous parts of the Circars of Hindostan, flowering in the cold season; is also found in the N. W. Provinces, Abyssinia, Southern Arabia and the Phillipines. The mealy powder, which consists of minute ruby-like glands covering the capsule, and the tomentum on the underside of the leaves, yields a dye called "Kameela," which is used as a vermifuge, and whose action, according to Dr. Royle, depends on the minute stellate hairs found in the powder, which is of a rich purplish red color, having a melon-like heavy odour. It mixes with difficulty in water, but when boiled with alkaline salts, gives out a very deep blood-red color. The dye is used all over India, and imparts a fine yellow color to silks. Kameela has been analysed by Anderson of Glasgow (1855) and Leube (1860). From their accounts it appears that the powder yields to alcohol or ether nearly 80 per cent of resin. Fluck. and Hanby. found it soluble also in glacial acetic acid and sulphide of carbon, but not in petroleum ether. By treatment of the resin extracted by ether with cold alcohol, Leube resolved it into two brittle reddish-yellow resins, of which the one resin **A** is more soluble and fuses at 80° cent, and the other, resin **B**, dissolves less readily and fuses at 191° cent. Both dissolve in alkaline solutions and can be precipitated by acids without apparent change. Leube assigns to Resin **A** the composition of $C.^{30}$ $H.^{9}$ $O.^{8}$ and to Resin **B**—$C.^{16}$ $H.^{6}$ $O.^{10}$—(*Fluckiger and Hanbury Pharm., Loudon & Royle.*)

Croton tiglium, *Rox. Fl. Ind. iii. p.* 682; *Ainslie Mat. Ind. i. p.* 101. *Purging Croton.*

Linn Syst. *Monœcia Monadelphia.*

The seed and oil.

Vernacular—Jumalgota, *Hind.*; Jhayal, *Beng.*; Dund, *Pers.*; Batoo, *Arab.*

A small tree 15 to 20 feet high, found generally throughout India. It is cultivated in gardens from the Mauritius to the Indian Archipelago. The seeds (*Semen tiglii*), which were officinal in the 17th century, but had become obsolete, were recommended by English medical officers (*Ainslie Mat. Med.*), as also the expressed oil by Perry, Frost, Conwell, and others about 1821-24. The oil is so powerfully irritating that a drop placed upon the tongue has the effect of exciting irritation along the whole intestinal canal, which does not readily subside. The drastic principle of croton has not yet been isolated. It appears not only in the seeds but in the wood and leaves of the plant; from which latter it may possibly be more readily extracted. The seeds of *Croton polyandrum* (*Roxb.*), *C. oblongifolius* and *C. pavana* species, more or less common throughout India, partake of the nature of *C. tiglium*, and according to Roxburgh are used by natives as a purgative. The oil of *C. tiglium* is a drastic purgative, and in overdoses an acro-narcotic poison. Externally it is applied as a rubefacient. In dropsical affections, extreme torpor of the bowels, and affections of the brain it has been employed with advantage.—(*Pharm. of India, Pharmacographia, Lindley.*)

Croton plicatum, *Roxb. Fl. Ind. iii. p.* 681. *Folded Croton or Indian Turnsol.*

Linn. Syst. *Monœcia Monadelphia.*

Vernacular—Suryavarti, *Sans.*; Bun-jypul, Koodee-okra, *Hind., Beng.*; Soobalee, *Sind.*

An annual straggling shrub seldom growing above 4 feet in height, with a round herbaceous stem, the whole plant covered with a

hoary pubescence; leaves alternate, petioled, round, cordate, crenate, hirsute; peduncles terminal, 3-4 flowered; flowers pale yellow, males above the female; calyx cylindrical, 5-toothed; petals 5; stamens 10-15; fruit scabrous.

Found in Sind, Bengal, Southern and Western India.

The juice of the green fruit contains a colouring matter, and might be usefully employed as a blue dye. The seeds are used by natives as a purgative.

Phyllanthus emblica, *Roxb. Fl. Ind. iii. p.* 671. *Shrubby or Officinal Emblic.*

Linn. Syst. *Monœcia Monadelphia.*

The fruit—Emblic myrobalan.

Vernacular—Owla, Ownla, Amla, *Hind., Dec.*; Amuleh, *Pers.*

Found wild throughout the Concans and Deccan, and is cultivated in many other parts of India. *Emblic myrobalan* of commerce, when fresh, is used as a condiment, preserved in sugar,—dried, it is employed for tanning, and is valued as an astringent in bowel complaints. Antiscorbutic virtues are assigned to it by Dr. McNab (*Calcutta Med. Phys. Trans.* vol. VIII., and *Calcutta Quarterly Med. Journal,* 1837) but Dr. Irvine (*Med. Topog. of Ajmere* p. 118) is of opinion that it does not possess any peculiar virtues, and is not superior to any other acid vegetable astringent.

Phyllanthus niruri, *Linn.*; *Roxb. Fl. Ind. iii. p.* 659.

Linn. Syst. *Monœcia Monadelphia.*

The leaves and young shoots.

Vernacular—Niruri, *Hind., Sind.*

An erect annual, 1-2 feet high, with numerous herbaceous branches; branchlets filiform; leaves pinnate, elliptic, obtuse, mucronate; leaflets obtuse, glabrous, nearly sessile; peduncles axillary; flowers greenish, minute, beneath the leaves; male and female calyces 6-parted; capsules tricoccous.

Common in Sind, Kutch, the Deccan, Malabar coast, Bengal and the Southern Presidency. The leaves, roots and young shoots are much employed in gonorrhœa and other genito-urinary affections. They have been mentioned favourably by Horsefield and others, but are said not to possess any special claim to notice. In jaundice the root has been used with success. The bark is used in dyeing.—(*Lind. Pharm. of Ind.*)

Phyllanthus multiflorus, *Roxb. Fl. Ind. iii. p.* 664. *Many-flowered Phyllanthus.*

Linn. Syst. *Monœcia Monadelphia.*

The leaves and young shoots.

Vernacular—Kamohee-jo-pun, *Sind*; Booin-owla, *Dec., Hind.*; Krishna Kamojee, *Sans.*; Panjoolee, *Punj.*

The fruit—Packa-peeroo, *Sind.*

A large scandent shrub, with bifarious, oblong, obtuse, short-petioled, pinnate leaves, netted with reddish veins; leaflets alternate, oval, and slightly pubescent; flowers purple, racemose, and fasciculate on slender pedicels; calyces of both sexes, 5-leaved; male flowers several, female 1-2; fruit depressed, pulpy; 8-12 seeded.

Found climbing on trees in the forests of Sind, also in Rajpootana and Cutch and in the Bengal, Madras and Bombay Presidencies, growing on moist ground and delighting on river banks and watercourses.

The leaves are considered diuretic, and to possess cooling properties. The bark is considered alterative and attenuant. It is also used in dyeing a reddish brown.—(*Stocks, Ainslie.*)

Phyllanthus madraspatensis, *Linn.*; *Roxb. Fl. Ind. iii. p.* 671. *Madras Phyllanthus.*

Linn. Syst. *Monœcia Monadelphia.*

Vernacular—Niruri, Sada-munnee, *Hind., Sind.*

A small shrub, seldom above 4 feet high, with a round ramous stem; leaves alternate, sessile, lanceolate, cuneate, mucronate; stipules cordate; flowers solitary, stalked, axillary; calyces of female flowers 6-toothed, blunt; male 5-toothed; capsule 3-celled; 2-seeded.

Indigenous in Sind and perhaps in the Punjab and Cutch.

An infusion of the leaves is considered an useful remedy for headaches.

ALLIANCE 21. *QUERNALES.*

N. O. 95. CORYLACEÆ,—*MASTWORTS.* Lind.—Bal. 212. *Cupuliferæ.*

Quercus infectoria, *Linn.* *Dyer's Oak.*

Linn Syst. *Monœcia Polyandria.*

The galls.

Vernacular—Mahaphul, Mazoo, *Hind., Dec.*; Mawa, *Sind.*

Found in Koordistan and Asia Minor. The excrescences on this shrub caused by the punctures and deposited ova of a cynips (*Diplolepis gallæatinctoria*) constitute the well known nut galls of commerce. They are sent to England from Bombay, where they are first imported from the Persian Gulf. Their active constituents are tannic and gallic acids, powerful astringents topically or internally. Seldom exhibited in the latter way. Strikes a powerful black with the persalts of iron, and is the basis of black dyes and writing ink. Used sometimes as a tonic by Indian practitioners. A very valuable remedy (as gallic or tannic acid) for sore throats, relaxed tonsils, and coughs.—(*Royle, Pharm., Ainslie, Pereira.*)

N. O. 96. JUGLANDACEÆ,—*JUGLANDS.* Lind.—Bal. 215.

Juglans regia, *W.* *Common Walnut.*

Linn. Syst. *Monœcia Polyandria.*

The nut and bark.

Vernacular—Akhrote, *Hind.*; Khagzee, Akrot, Ukshod, *Punjab.*
The bark,—Dindasa, Musag, *Sind, Punjab.*

Not uncommon wild, and commonly cultivated in the Himalayas from 5,000 to 10,000 feet and in Tibet. Grows also in Afghanistan, the Trans-Indus, and more sparsely in Beloochistan.

In Kashmere walnut oil is preferred to linseed, and is employed for cookery and burning in lamps. The bark is acrid and purgative, as also is the rind of the fruit notwithstanding its astringency. As *Dindasa* and *Musag* of the bazaars, the bark is masticated by native women to preserve and redden their gums. Honigberger states that a twig is recommended to be kept in a room to dispel flies. The husk or outer covering of the fruit yields a dye used for staining wood. The edible nut is brought into Sind from Khelat and Muscat.—(*Dr. Stewart, Lind., Cleghorn, Dr. Stocks, Brandis.*)

ALLIANCE 23. *MENISPERMALES.*

N. O. 101. MYRISTICACEÆ,—*NUTMEGS.* Lind.—Bal. 180.

Myristica fragrans, *Hout* ; *M. moschata, Thunb.* *True Nutmeg.*

Linn. Syst. *Diœcia Monadelphia.*

The oil, nutmeg, or albuminous nut; and mace, or aril.

Vernacular—Gowzul-teib, *Arab.*; Jowz-bewa, Jaiphul, *Hind., Dec.*; Jaiputree (mace), *Dec., Pers.*

A bushy evergreen tree cultivated in the Western Peninsula of New Guinea, Sumatra, Penang, Malayan Peninsula, Ceylon, Malabar, and in some parts of tropical America. It produces spheroidal drupes, fleshy and smooth; finally drying up into a coriaceous crust, and opening on one side. Each berry contains an ovate globular serrated nut, black, clasped by a five branching aril of a reddish saffron colour, which is called mace. As met with in commerce, mace occurs in single or double blades, flat, irregularly slit, smooth, slightly flexible and brittle, having an odour and taste like that of nutmegs. It yields by distillation a volatile oil. The oil of the kernel or nutmeg is white and lighter than water, acrid, and pungent. The nutmeg has a fragrant, agreeable spicy odour and a warm aromatic taste. Both nutmeg and mace are employed as condiments, and also in medicine.—(*Pharmacographia, Pharm. of Ind., Royle, Mat. Med.*)

N. O. 104. MENISPERMACEÆ,—*MENISPERMADS.* Lind.—Bal. N. O. 6.

Tinospora cordifolia, *Miers.*; *Rheede Mal. 7 t.* 21. *Cocculus Cordifolius, DC. Prod. i.* 97. *Hk. Fl. Br. Ind. i.* 97.

Linn. Syst. *Diœcia Dodecandria.*

Vernacular—The plant—Amurta Gudoochee, *Sans.*; Galancha, *Beng.*; Goolwail, *Dec.*; Gurcha, *Hind.*; Gilo-gularich, Zakmihyut, *Punjab.* The extract—Palo, Sut-gilo, *Hind., Punj., Dec., Sind.*

A lofty climbing shrub with scabrous, corky, tubercled bark, and broad cordate and glabrous leaves; petiole $1\frac{1}{2}$–3 in.; racemes axillary, terminal; bracts subulate; flowers yellow, males fascicled, females usually solitary, glabrous; petals cuneate; drupe red, size of a pea.

Common in hedges and jungles throughout tropical India, Kumaon to Assam and Burma, Bengal, Deccan, and Concan, also Orissa, Carnatic and Mysore.

The virtues of this plant, which were long known to native physicians, attracted the attention of Europeans in 1827. The root and stems from which the extract is obtained are collected during the hot season, when the bitter principle is most abundant. Both possess tonic, antiperiodic, and diuretic properties, and are used in native medical practice in infusion for colds, fevers, and leprous affections. An infusion of the young stems and leaves is highly esteemed in native practice as a febrifuge, and also as a tonic; while in some parts of Southern India it is looked upon as a certain cure for poisonous snake-bites. Ainslie says that the plant is put into the water drunk by the Brahmins at some of their religious ceremonies In intermittents, general debility after fevers, and secondary syphilitic affections and chronic rheumatism both have been employed with good results.

The extract, which is obtained by maceration and evaporation from the stems and roots, is esteemed in intermittent fevers, and may be used in all diseases in which the roots and stems are employed.—(*Graham, Lindley, Brandis, Dr. Stewart, Markham's Travels in Peru and India.*)

Cocculus villosus, *DC.*; *Plu. am. t.* 384, *f.* 7 *Villous Cocculus.*

Linn. Syst. *Diœcia Dodecandria.*

Vernacular—Kursan, Zamir, *Sind*; Hooyer, *Beng.*; Dhyer, Fareed-bootee, *Hind.*

A scandent shrub with a somewhat woody stem, and furrowed villous branchlets; leaves alternate, short-petioled, oval or ovate, oblong, downy, 3–5 nerved; male panicles axillary; bracts linear, minute; sepals 3, villous; petals 3, acute; female flowers solitary, axillary, 2–3 fasciculate; drupe, dark purple; nuts reniform.

Common in Sind, Punjab, Kutch, Deccan, Bengal, and Madras.

The leaves macerated in water form a consistent green jelly, and the juice of the ripe berries makes a durable purple ink. The root and leaves are used for headaches, and in neuralgic pains, and, like those of the last, are of much repute in the treatment of intermittent fever; but the natives in Sylhet consider that they are more efficacious when found climbing on mango trees.—(*Dr. Stewart, Graham, Markham's Travels in Peru.*)

Cocculus leæba, *DC.*; *Plu. am.*, *t.* 384; *H. F. & T. Fl. Ind.* 192.

Linn. Syst. *Diœcia Dodecandria.*

Vernacular—Ullar-billar, *Punj.*, *Sind.*

A scandent shrub, with a woody stem 3 to 4 feet in girth; branchlets pubescent; leaves alternate, petioled, oblong or trapezoid, smooth, entire, 3–5 lobed; flowers axillary, pedicelled; male flowers fasciculate; female solitary, axillary, peduncled; drupe small.

Common in the Punjab and in Sind, Beloochistan, and Afghanistan; also in Arabia and Persia.

Possesses in a lesser degree the bitter and tonic properties of Cocculus cordifolius (*gulancha*). Used in Sind and Afghanistan in intermittent fevers; also said to be used as a partial substitute for hops in the manufacture of Indian "beer."

Jateorhiza columba, *Miers*; *M. columba, Roxb. Fl. Ind. iii.* 807.

Linn. Syst. *Diœcia Hexandria.*

The root Columba or Calumba.

Vernacular—Columb-ke-jur, *Hind.*, *Sind.*

Columba root is an excellent tonic, and is extensively used in native pharmacy in Sind; useful in cases of diarrhœa and debility after fevers. Combined with catechu in infusion with the addition of spices, it is said to be efficacious in debility of the digestive organs.

Cissampelos pareira, *DC.*; *Lam: ill. t.* 830.

Linn. Syst. *Diœcia Monadelphia.*

The root—Nirbisee, *Dec.*; Katoree, *Sind, Punjab.* The leaves—Belpath. The root—Peelajur.

Occurs in the Punjab. The leaves and roots are both employed largely in native practice for the cure of ulcers.

Stephania rotunda, *Lour. Coch.* 747. *Menispermum peltatum. Willd. iv.* 827 ; *Roxb. Fl. Ind. iii.* 842

A shrubby twining plant; leaves peltate, cordate, entire, 9-nerved ; pale beneath ; petiole 3–9 in. ; peduncles variable ; bracts subulate ; flowers yellow, ¼ in. dia. in lax cymes ; male flowers umbelled with a six-leaved calyx and three-petalled corolla ; female calyx three-leaved ; corolla three-petalled ; drupe pisiform.

Common in Sind during July, also in Kutch, and probably also the Punjab.

ALLIANCE 24. *CUCURBITALES.*

N. O. 105. CUCURBITACEÆ,—*CUCURBITS.* Lind.—Bal. 92.

Citrullus colocynthis, *W.* ; *Boiss. Fl. Orient. ii.* 759. ; *Colocynth Gourd.*

Linn. Syst. *Monœcia Monadelphia.*

The fruit.

Vernacular—Indrawun, *Hind.* ; Bishloomba, *Punj.* ; Honzil, *Dec.* ; Tru-jo-gosht, *Sind.*

This procumbent perennial is readily known by its angular hispid stems, ovate-cordate, and harshly scabrid leaves which are deeply divided into many obtuse lobes and muricated ; petiole 1 in. ; flowers yellow ; fruit globular 3–5 inches dia. ; intensely bitter.

It occurs in abundance in the arid wastes of the Punjab from Delhi up to Peshawur, in Sind, Kutch, sandy places on the Coromandel coast, Arabia, Persia, seashores of Guzerat, and other parts of the Western Presidency.

Colocynth has been used in medicine from the earliest ages, and is one of the plants supposed to be the *Pakyoth* or wild gourd of Scripture. It was familiar to the Greek and Roman, as well as to Arabian physicians ; and if we may judge by the mention of it in the Anglo-Saxon herbal of the 11th century (Cockayne Leechdoms, &c.) was not unknown in Britain.

The gourd, which is almost the size of an orange, when dried affords one of the most valuable medicinal agents derived from the order *Cucurbitaceæ.* The pulp is generally removed, and in fact is so found in the bazaars. The pulp is without odour, but is nauseously bitter. Hakeems in Sind prescribe it in cases requiring a brisk and powerful cathartic. The officinal part is the dried decorticated fruit freed from seeds. The active principle is a bitter resinoid substance, *colocynthin.* The fresh root is used as a tooth-brush, and dried and powdered is given as a purgative.—(*Bellew.*) In the form of tincture, Murray in his *Apparatus medicanunum* recommends it in gout, rheumatism, violent headaches and palsy, in dōses of 15 to 20 drops. Dr. Kirkpatrick in sending a collection of drugs to the Madras Exhibition with a statement of the qualities and uses as given by native practitioners states that the rind with rhubarb and nitre is used in suppression or repression of urine.—(*Pharmacographia, Royle, Ainslie, Lindley, Dr. Stewart, Cat. Mad. Exh.*)

Trichosanthes anguina, *Linn.* ; *Roxb. Fl. Ind. iii. p.* 701 ; *W. and A. Prod.* 350. *The Snake Gourd.*

Vernacular—Purwul, *Hind.* ; Pandol, *Sind.*

Cultivated for its fruit, which is eaten as a vegetable.

Cucurbita lagenaria, *Linn.* ; *Roxb. Fl. Ind. iii. p.* 718. *The Bottle Gourd.*

Vernacular—Hurrea-Kuddoo, *Sind.*

Cultivated for its fruit, which is eaten as a vegetable.

Cucurbita citrullus, *Roxb. Fl. Ind. iii. p.* 319; *W. and A. Prod.* 351. *The Water Melon.*

Vernacular—Thurbooz, *Hind., Sind.*

Cultivated for its fruit.

Cucurbita fistulosus, *Stocks, Hook. Kew Journ. Var. C. citrullus.*

Vernacular—Meho, Dilpasand, *Sind.*

Stems thick; leaves palmately lobed, glabrous or hairy; fruit small, globose.

Cultivated in Sind, Punjab, Kutch and Guzerat; eaten as a vegetable.

Cucurbita maxima, *DC.*; *Wall. Cat.* 6720. *The Common Gourd.*

Cultivated.

Cucurbita melopepo, *Roxb. Fl. Ind. iii. p.* 719. *C. moschata. Duchesne DC. Prod. iii. p.* 317. *The Musk Melon.*

Vernacular—Koomra, *Sind, Hind.*

Cultivated largely for its fruit in Sind, Punjab, Kutch, Beloochistan, Afghanistan, and throughout India.

Cucurbita pepo, *DC.*; *Roxb. Fl. Ind. iii. p.* 718. *The Pumpkin or White Gourd.*

Vernacular—Safaid Doodya, Kuddoo, *Sind.*

Cultivated for its fruit, eaten as a vegetable.

Luffa pentandra, *Roxb. Fl. Ind. iii. p.* 712.

Vernacular—Ghiu-tooree, Toorai, *Sind.*

Cultivated for its fruit, which is eaten as a vegetable.

Luffa acutangula, *Roxb. Fl. Ind. iii. p.* 713; *Wall. Cat.* 6759. *Acute-angled Cucumber or Luffa.*

Vernacular—Toorai, *Sind, Punjab.*

Cultivated for its fruit. The seeds of both this species and *L. pentandra* are prescribed as an emetic in Sind, and Bellew says that in the Peshawar Valley they are given as an emetic and cathartic with black pepper in warm water.—(*Dr. Stewart.*) The seeds of *Luffa amara* (Roxb.) are said to be violently cathartic.

Luffa echinata, *Roxb. Fl. Ind. iii. p.* 716; *Dalz. and Gibs. Bomb. Fl.* 102. *Bristly Luffa.*

Vernacular—Jungthoree, *Sind.*

Fruit ellipsoid, covered with bristles, not ribbed as in *L. pentandra* and *L. acutangula.*

Indigenous in Sind and Guzerat, probably also in Kutch. Fruit not eaten.

Benincasa cerifera, *W. and A. Prod.* 344. *The Pumpkin.*

Vernacular—Gol Kuddoo.

Cultivated.

Momordica charantia, *Linn.*; *Roxb. Fl. Ind. iii. p.* 707. *The Hairy Momordica.*

Vernacular—Karelo, *Sind*; Karayla, *Hind.*, *Dec.*

Cultivated for its bitter fruit, which is eaten as a vegetable.

Momordica balsamina, *Linn.*; *DC. Prod. iii. p.* 341. *The Balsam Apple.*

Vernacular—Karelo-Jangro, *Sind.*

Fruit ovoid, smooth, not ribbed or covered with tubercles as in *M. charantia,* tapering at both ends. Eaten in pickle.

Indigenous in Sind, Punjab, and N. W. India.

Cucumis prophetarum, *Linn.*; *Wall. Cat.* 6733.

A climbing plant; stem, leaves and petioles scabrous; leaves reniform, lobed; tendrils short, simple; flowers small, yellow, peduncled; peduncles short.

Indigenous in Sind and South Afghanistan at Sagee; occurs probably in Beloochistan also.

Cucumis trigonus, *Roxb. Fl. Ind. iii. p.* 722. *C. pubescens. Dalz. and Gibs. Bomb. Fl. p.* 103. *The Pubescent Cucumber.*

Vernacular—Chibbur, *Sind.*

A climbing plant; stem, leaves and petioles scabrous; leaves 5-lobed, lobes rounded, or nearly pentangular, dentate; fruit obsoletely 3-sided, or oval.

Indigenous in Sind, Beloochistan and South Afghanistan.

Cucumis melo, *Linn.*; *Roxb. Fl. Ind. iii. p.* 720. *C. cicatrisatis. Stocks. The Melon.*

Vernacular—Kurbooz, *Hind.*, *Sind*; Sardah, *Afg.*, *Beloochistan.*

Cultivated for its fruit. The rind and seeds of the fruit are considered diuretic in Sind.

Cucumis sativus, *Linn.*; *Roxb. Fl. Ind. iii. p.* 720. *The Common Cucumber.*

Vernacular—Kakree, *Hind.*; Kheera, *Sind.*

Cultivated; fruit eaten as a salad.

Cucumis amarus, *Stocks*; *Hook. Kew Journ.*

The fruit of this species sold in the bazaars of Sind in a dried state under the name of "Kirbut," is used medicinally as an emetic and in small doses, with honey as a vehicle, on account of its extremely bitter taste, is prescribed as a stomachic to children.

Coccinia indica, *W. and A. Prod.* 347; *Hook. Ic. Pl.* 138. *Dalz. and Gibs. Bomb. Fl.* 103.

Vernacular—Kundooree, *Sind, Punj.*

A climbing plant; stems hispid; leaves scabrous, petioled, 5-angular or 5-lobed; flowers solitary, white; peduncles jointed below the flower; fruit bright red or scarlet.

Indigenous in Sind, Punjab, and the Deccan.

Zehneria cerasiformis, *Stocks*; *Hook. Kew Journ.*

Stem climbing or creeping; tendrils simple; leaves orbicular, 5–7 lobed, middle lobe longest; bracts elliptic, ciliate, stipuliform at the axils of the leaves; flowers small; males in racemes, females solitary; fruit small, ellipsoid, ½–1 inch.

Indigenous in Sind, Punjab, and Guzerat. Is good fodder for cattle, and is said to act as a lactagogue.

Æchmandra epigæa, *Arn.*; *Hook. Journ.*; *Dalz. and Gibson's Bomb. Fl. p.* 100.

Stem climbing or prostrate, tomentose; leaves petioled, scabrous, 2 in. diam, 3–5 lobed; lobes commonly broad; flowers small, monœcious, corymbose at the apex of a long peduncle; male peduncle 1½–2 in., female ¼–1 in.; fruit ⅜ in., ovoid, suddenly contracted into the beak.

Indigenous in Sind, Punjab, Guzerat, and the Deccan.

The root of this plant was once supposed to be the famous *Calumba*. It is employed as an alterative tonic, and is highly valued in native practice in syphillitic cases and in the advanced stages of dysentery. The people of the Deccan regard it as a powerful internal and local remedy in snakebites, &c.

Æchmandra conocarpa, *Hook.*; *Dalz. and Gibs. Bomb. Fl.*

Not unlike *Æ. epigæa*; leaves villous; fruit sessile, conical, not suddenly contracted into the beak; seed ellipsoid.

Æchmandra velutina, *Dalz. and Gibs. Bomb. Fl.*; *Corallocarpus velutina. Hook. f. Gen. Pl. i.* 831.

Common in Sind, Deccan, and the Persian Gulf.

Bryonia scabrella, *Willd. iv.* 619; *Roxb. Fl. Ind. iii. p.* 725. *Bristly Bryony.*

Linn. Syst. *Monœcia Syngenesia.*

Vernacular—Agumuki, *Hind.*; Bellari, *Sind.*

A climbing plant, with a 5-angled hispid slender stem; leaves alternate, petioled, 3-lobed, toothed, hispid on each side; lateral lobes dilated, angular, middle elongated; tendrils simple; fruit or berry the size of a pea, smooth, striated; seeds several.

This is a native of various parts of India, delighting in rubbish and in hedges. Flowers in the cold and wet season, extremely common in the Western and Southern Presidencies, also in Sind and the Southern Punjab. The root is said to possess in a slight degree the properties of *Æ. epigæa* (Arn.). The purgative properties of Bryony root have been long known; and, in the opinion of some modern writers, have fallen into unmerited neglect. It is said to be equal in power to jalap, even when dried and powdered. The natives of the Deccan esteem it a powerful internal and local remedy in snakebites. (Dr. Walker *Bom. Med. Phys. Trans.*) The people of Mysore also use it for the same purpose. Ainslie justly remarks that the root possesses virtues worthy of more definite investigation.—(*Loudon, Lindley, Roxb., Graham, Dr. Stewart, Pharm. of Ind.*)

N. O. 106. DATISCACEÆ,—*DATISCADS.* Lind.—Bal. 193.

Datisca cannabina, *Linn.* *Hemp-like Datiscus.*

Linn. Syst. *Diœcia Dodecandria.*

The herb and roots.

Vernacular—Ukalbare, Bayr Bunja, *Hind.*, *Punj.*

Datisca is bitter and purgative, and is occasionally used in fevers and in gastric and scrofulous complaints. In some places where it grows the yellow root is used to aid in dyeing red, and Cleghorn states that it is exported from Panji, Lahoul and Kullu to Nadoun and Umritsur to be used in dyeing woollen thread. Edgeworth mentions that for this purpose it is combined with *Asburg* (*Delphinium saniculæfolium*). In Khagan the bruised root is applied to the head as a sedative; and Madden states that under the name of *Bujr Bunga* it is used medicinally in Kurnool.—(*Dr. Stewart, Cleghorn Punj. Rep.*)

ALLIANCE 25. *PAPAYALES.*

N. O. 108. PAPAYACEÆ,—*PAPAYADS.* Lind.—Bal. N. O. 93.

Carica papaya, *W.* *Common Papaw.*

Linn. Syst. *Diœcia Decandria.*

The seed and fruit.

Vernacular—Puppai, Papay, *Hind.*

A native of the Western Hemisphere now domesticated in India and other tropical countries. It rises with a thick, soft, herbaceous stem to the height of 18 or 20 feet, naked till within two feet of the top, and having marks of the fallen leaves on the greater part of its length. The leaves have long footstalks, are very large, and divided into many lobes. The whole plant abounds with a milky acrid juice which is esteemed good for the ringworm. The juice of the unripe fruit is a most powerful and efficient vermifuge, (the powder of the seed also answers the same purpose). A constituent of the juice is said to be a fibrine principle, formerly supposed peculiar to the animal kingdom and to fungale. (*Lind.*) The anthelmintic properties of the milky juice of the unripe fruit were first noticed in the 17th century by Hernandez; and the attention of the profession in India was called to it in 1810 by Dr. Fleming (*Asiatic Researches*, vol. XI.), who cites an interesting passage from the writings of the Charpentier Cossigni in support of its alleged virtues. Further confirmatory evidence has more recently been adduced by M. Bouton (*Med. Plants of Mauritius*, 1857, p. 65), and it may justly be concluded that the statements as to its efficacy as an anthelmintic are founded on fact. A popular belief in the powerful emmenagogue properties of the fruit prevails amongst all classes of women in Southern and Western India, so much so that they assert that if a pregnant woman partake of even a moderate quantity, abortion will be the probable result. The tree has the singular property of rendering the toughest animal substances tender by destroying the cohesion of the muscular fibre; its very vapour is said to effect this. The juice most resembles animal albumen, dissolving like it in water. Its solution is coagulated by heat, by acids, alkalies, the metallic salts and infusion of nut galls; and by distillation it yields the same products as animal substances.—(*Pharm of Ind.*, *Ainslie, Loudon, Lindley.*)

N. O. 109. PANGIACEÆ,—*PANGIADS.* Lind.—Bal. N. O. 93.

Hydnocarpus odorata, *Roxb. Fl. Ind. iii. p.* 836-837.

Linn. Syst. *Diœcia Pentandria.*

The seed and oil.

Vernacular—Chaulmogra.

Oil generally used in cutaneous affections.

N. O. 110. FLACOURTIACEÆ,—*BIXADS.* Lind.—Bal. 18.

Flacourtia sapida, *W. Esculent Flacourtia.*

Linn. Syst. *Diœcia Icosandria.*

The seed.

Vernacular—Kundayeo, Bunj, Bowchee, *Hind., Dec.*

Found in the Bengal and Bombay Presidencies. In the salt range along the lower hills, sometimes up to 3,500 feet, and on the skirts of the Suliman range it is found as a large shrub. Native inoculators in the Punjab use the thorns for breaking the pustules of the small-pox on the 9th or 10th day. After child-birth among natives in the Deccan the seeds are ground to a powder with turmeric and rubbed all over the body to prevent rheumatic pains from exposure to damp winds. The small leaves and tender shoots of *Flacourtia cataphracta* (Panayala of Bengal and Talisputree of the Deccan), are considered stomachic in a slight degree and astringent, and are prescribed in powder, generally in doses of half a drachm, in diarrhœa, weakness, and consumption. The virtues of the plant, if any, rest solely on native testimony; an infusion of the bark in cold water is used in Behar in cases of hoarseness.—(*Ainslie, Pharm. of Ind., Dr. Stewart.*)

N. O. 115. MORINGACEÆ,—*MORINGADS.* Lind.—Bal. 75,

Moringa pterygosperma. *Horse Radish Tree.*

Linn. Syst. *Decandria Monogynia.*

The root and seed.

Vernacular—Sainga, Sohounjun, *Hind.*; Saignt, *Dec.*; Sajana, *Beng.*

This tree grows in Arabia, Egypt, Ceylon, Madras and other parts of the Peninsula, and is cultivated in gardens. In the Siwalik region in the eastern Punjab it grows wild, and is also planted throughout the province. In Sind it is planted on roadsides and cultivated in gardens. The seeds are the Ben-nuts of old writers on materia medica, and the *Hubbulban* of the Arabians, from which the oil of Ben was extracted, formerly more famed than at present. It is chiefly used by perfumers as the basis of other scents, and by watchmakers because it does not readily freeze. The root has a pungent odour with a warm, biting, and somewhat aromatic taste similar to horse-radish. It is used as a stimulant in paralytic affections and intermittent fever, also employed as a rubefacient and vesicant, but the pain it causes is said to be an objection to its use. In epilepsy and hysteria it is also prescribed by hakeems. Dr. Wight suggests the addition of the expressed juice to sinapisms, as tending to increase their activity. Where the tree is plentiful a gum resembling Tragacanth is obtained by incision from the bark, known in the bazaars as mochurrus, and is administered in rheumatism. As an internal remedy, stimulant and diuretic properties have been assigned to the root, and Dr. G. Bidie (*Mad. Quart. Med. Journal*, 1862) is probably correct in regarding it as a perfect substitute for *armoracia.* The seeds (called by the French *poisqueniques* and *chicot*) have also been used in venereal affections. The flowers, leaves and tender seed vessels are eaten as a potherb or in curry, and find much favor with the natives of Madras, and the root is used by Europeans precisely as is that of the horse radish in England as a condiment with roast beef.—(*Lindley, Pharm., Ainslie, Mat. Ind., Dr. Stewart.*)

Moringa concanensis, *Nimmo*; *Brandis For. Flo.* 130; *Dalz. and Gibs. Bom. Fl.* 311; *Hook. Fl. Br. Ind. ii.* 45.

Linn. Syst. *Decandria Monogynia.*

Vernacular—Mooah, *Sind*; Sainjnah, *Rajp., Conc.*

A small tree, 15–20 ft., young branches pubescent; leaves bipinnate, 1–2 ft. long; pinnæ 4–6 pair, leaflets 1–1½ in., broadly

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ovate, petioled; petioles $\frac{1}{3}$ in. long; nerves lateral; 4–6 pair distinct; flowers pedicelled, yellow; petals yellowish, streaked with pink; pod pendulous, 9–18 in. long, 9-ribbed; seeds $\frac{1}{2}$ in. long, winged, trigonous; flowers in November and December.

Indigenous on the hills in Sind, also in Rajpootana and South Concan.

The unripe fruit or pod is eaten, as also the flowers, as a potherb. The roots, as of *M. pterygosperma*, have a pungent flavour, and are said to be used as a substitute for horse-radish.

ALLIANCE 26. *VIOLALES.*

N. O. 116. VIOLACEÆ,—*VIOLETWORTS.* Lind.—Bal. 20.

Viola odorata, *W. Sweet Violet.*

Linn. Syst. *Pentandria Monogynia.*

The flowers.

Vernacular—Banuphsha, *Hind.*; Behussej, *Arab.*

This plant is a native of every part of Europe. The petals are used as a laxative for children, one drachm operating pretty freely. The seeds possess similar properties. The root is emetic and purgative, and the plant in the dry state is prescribed by native doctors as a diaphoretic. The aqueous tincture of the flowers is a useful chemical test, uncombined acids changing the blue to red, and alkalies to green, for which purpose it is cultivated to some extent at Stratford-upon-Avon. By some the flowers are considered anodyne, and Triller mentions a case in which their use produced apoplexy.—(*Loudon, Lindley, O'Shaughnessy.*)

Viola cinerea, *Boiss, Fl. Orient. i.* 454; *Hk. Fl. Br. Ind. i.* 185.

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Banafsha, *Sind, Punjab.*

Perennial, stem short, glabrous; branches diffuse; leaves alternate, $\frac{1}{4}$–$\frac{1}{2}$ in., slightly serrate, lanceolate, acute or elliptic-ovate, petioled; petioles as long as the leaves; peduncles slender, axillary, solitary, 1-flowered; bracts subulate; sepals lanceolate, aristate; style clavate, compressed, stigma of 2 oblong parallel disks; flowers $\frac{1}{4}$ in. dia.

Common on the dry hills of Sind and on the Punjab plains, also in the salt range and Trans-Indus. Distributed in Persia, Beloochistan and Afghanistan. Extremely common at Chaman (South Afghanistan).

Both this species and *V. repens* constitute the "Banafsha" of the bazaars.

N. O. 117. FRANKENIACEÆ,—*FRANKENIADS* or *SEA-HEATHS.*

Frankenia pulverulenta, *Linn.*; *Boiss. Fl. Orient. i.* 779; *Hk. Fl. Br. Ind. i.* 212; *Willd. Eng. Bot.* 2222. *The Powdery Sea-Heath.*

Linn. Syst. *Hexandria Monogynia.*

Vernacular—Khareeya, *Sind.*

A prostrate exceedingly-branched diffuse annual, branches wiry, articulate; leaves opposite, small, $\frac{1}{6}$–$\frac{1}{4}$ in., short petioled,

roundish ovate, hoary or powdery beneath; flowers pink, sessile in the divisions of the branches, solitary, small, hermaphrodite; petals small, sub-repand, equalling the sepals in number; sepals persistent, united in a furrowed tube; calyx glabrous.

Common on the sea coast of Sind; also on the salt plains of the Punjab, and probably also in Kutch.

Valued by native practitioners in the fresh state for its mucilaginous and aromatic properties; exhibited in the form of decoction in empyreuma.

Viola repens, *Roxb.* *The Field Violet.*

Linn. Syst. *Pentandria Monogynia.*

The root.

Vernacular—Beg Sosan, *Hind.*; Ruttonjoth, *Sind.*

This plant, *V. reniformis* and *V. kunawarensis* are Himalayan species, found respectively in Mysore, the Choor mountains, and Kunawar, and are considered diaphoretic and aperient. *Viola canina* is reputed a powerful agent for the removal of cutaneous affections.—(*Lindley, Dr. Stewart, O'Shaughnessy.*)

N. O. 118. TAMARICACEÆ,—*TAMARISKS.* Lind.—Bal. 25.

Tamarix indica, *Roxb. Fl. Ind. ii.* 101. *Indian Tamarisk.*

Linn. Syst. *Pentandria Trigynia.*

The galls, and the saccharine exudation.

Vernacular—Burremye-toorfa, Sumrut-ul-toorfa, *Hind.* The wood Jhao, Ragemye.

A shrub or small tree 6 to 15 feet high, trunk generally crooked; branches numerous, spreading; leaves minute, subulate, amplexicaul or semi-amplexicaul, tubular, glabrous, edged with white; spikes terminal, elongated, panicled; bracts shorter than flower-stalks, solitary, 1-flowered; flowers numerous, minute, sessile, white, mostly bisexual, on terminal, drooping racemes; calyx penta-partite; corolla 5-petalled; capsules 1-celled, 3-valved, ovoid.

This is usually found as a shrub in Sind, and sometimes of larger growth. From the sea to Kalabagh any quantity is procurable. It constitutes the greater part of the jungles in upper and lower Sind, and is very serviceable to the inhabitants. It is found to 10,600 feet on the Shayokh in Ladak, 3 feet in girth and 30 feet high. In the Deccan it grows abundantly as a small tree or shrub in the beds of many rivers, and affords shelter to all sorts of game. A great quantity of saccharine matter called Gazanbeen is obtained from it, which yielded to Ludwig on analysis dextrin, uncrystalizable sugar and organic acids. The galls (sakun), produced by the attack of a cynips, are used as a mordaunt dye, and possess astringent properties. The late Dr. Stocks in a letter to Dr. J. Forbes Watson (13th January 1852) speaks highly of the astringent properties of Tamarix galls, and from personal experience recommends a strong infusion of them as a local application to foul sloughing ulcers and phagedenic buboes. They act in virtue of the tannic and gallic acid which they contain. By natives they are also administered internally in dysentery and diarrhœa. Other species as the *T. diœcia* (*lall jhou*) and *T. orientalis* (*asree lye*) also yield galls used for the same purposes as those of this species. The species under notice and *T. africana* are remarkable for the quantity of sulphate of soda their ashes contain. The bark of all species of Tamarix is bitter and astringent. The wood is of the greatest utility as firewood, and being so plentiful and within the reach of all, enables the poor cultivator to retain the dung of his cattle for manure instead of using it as fuel. —(*Lindley, Pharm., Birdwood, Stocks, Lt. James' Report on Chandooka Pergunna, Upper Sind.*)

ERRATA.

Viola repens, *Roxb.* read under N. O. 116. VIOLACEÆ.

Tamarix orientalis, *Forskl. Pl. Ar.*

Linn. Syst. *Pentandria Pentagynia.*

Vernacular—Choteemye, Misree Lye, *Hind.*; Ghuz, *Pers.*; Asree Lye, *Sind*; Faras, *Punj.*

A good-sized tree 30 to 40 feet high, with a girth of from 6 to 8 feet; branches grey with turbinate joints; leaves very short, sheathing, white edged; flowers sessile, pink, monœcious, fasciculate on slender terminal spikes; bracts triangular, acute, 1-flowered.

Common throughout Sind; in the Punjab plains chiefly from Delhi westward, along the more arid tracts up as far as Peshawur; and in Arabia, Persia and Africa.

The galls obtained from the tree are used like those from *T. indica* as an astringent and as a dye. Manna is also obtained from it. The wood is used in Sind in turnery. Seasoned wood weighs 63 lbs. per cubic foot. Sp. gravity 1·008.—(*Dr. Stewart.*)

N. O. 122. CISTACEÆ,—*ROCKROSES.* Lind.—Bal. 19.

Cochlospermum gossypium, *DC. Brandis. For. Fl. p.* 17. *Silk Cotton Tree.*

Linn. Syst. *Polyandria Monogynia.*

The gum.

Vernacular—Kumbi. The gum—Kutheeragond, *Hind.*, *Gujra.*, *Punj.*; Buddam-ke-gond.

This is found in the Deccan, Central Provinces, Behar, N. W. Himalayas, from the Sutlej to the Sardah. Dr. Stewart says he has not seen it west of the Jumna, and that it probably exists in the Siwalik region, in the east of the Punjab. A clear white semi-transparent gum (Kateera) exudes from the bark, and is used as a substitute for Tragacanth in the N. W. Provinces, also as a demulcent. Bellows for smelting iron are made from the leaves.—(*Dr. Stewart, Brandis, For. Fl., Royle.*)

N. O. 123. BRASSICACEÆ,—*CRUCIFERS.* Lind.—Bal. 15.

Lepidium sativum, *Linn.* *Common Cress.*

Linn. Syst. *Tetradynamia Siliquosa.*

The seed.

Vernacular—Haleem, *Hind.*, *Dec.*; Ahroo, *Sind*; Shargundi, *Punj.*; Alleevree, *Beng.*; Assaria, *Sind.*

Grown in gardens and near wells and tanks. The seeds are mucilaginous. Medicinally prescribed as a laxative and applied to hurts or sprains as a poultice. As a lactagogue it is said to be effectual.—(*Loudon, Dr. Stewart, Birdwood.*)

Sinapis nigra, *W.* *Black-seeded Mustard.*

Linn. Syst. *Tetradynamia Siliquosa.*

The seed.

Vernacular—Sursoo, Suroo, Raiee, *Hind.*, *Dec.*; Ahor, Suraj, Kali Sursoon, *Sind.*

Found wild over the whole of Europe and extensively cultivated in many parts of the globe. In Sind and in many parts of India the young plant is eaten as a potherb. The flour of the seeds is employed in the form of a poultice as a rubefacient, acting also as a vesicant. It proves highly serviceable in the advanced stages or low forms of febrile and inflammatory diseases, in internal congestions, neuralgic and rheumatic affections. It is an efficient emetic, and taken in moderate quantities with food acts as a digestive. It is reckoned a medicine of great value by the Javanese and Chinese.

All species yield a fixed oil by expression from 28 to 36 per cent., having a strong smell and taste of mustard, and used in most parts of India by natives instead of (ghee) clarified butter in preparing their food. For anointing the body as the natives of Sind do, it is considered superior to any other. The oil distilled with water from the seeds of the species under notice, after the expression of the fixed oil, is colorless, or pale yellow. Composition $C.^4 H.^5 N. S.$ or $\left.\begin{matrix} C. & N. \\ C.^3 & H.^5 \end{matrix}\right\}$ S (allyl sulpho cyanide), boils at 148°C.; Sp. gr. 1·015; dissolves readily in alcohol and ether, and to a slight extent in water, to which is due the intensely penetrating odour and inflammatory action on the skin. The seed of *S. chinensis* are considered by native practitioners to be stimulant, stomachic and laxative.—(*Royle, Pharm. of Ind., Lindley, Pharm., Ainslie, Stocks.*)

Raphanus sativus, *Linn.* *Common Radish.*

Linn. Syst. *Tetradynamia Siliquosa.*

The seed and roots.

Vernacular—Mooli, Toorub, Fugil, *Hind.*; Mooree, *Sind.*

The RAPHANIS AGRIA of Theophrastus and Dioscorides and *Raphanus* of Pliny.

A well known salad plant cultivated all over the world for its root. There are about 14 species of this genus, which have all more or less the same properties. In the Punjab *R. caudatus*, *R. raphanistrum*, and the species under notice are cultivated, not only for their roots, but for their siliques which are used as a potherb. The roots of *R. caudatus* are recommended to be eaten with stale wheaten cake as a diet in the treatment for the cure of piles. The seeds are officinal, being reckoned emmenagogue. —(*Dr. Stewart, Lindley, Pharm., Birdwood.*)

Anastatica hierochuntina, *Linn.* *Common Rose of Jericho.*

Linn. Syst. *Tetradynamia Siliquosa.*

Vernacular—Kaf Mariam, *Arab.*

The generic name of this plant is derived from *Anastasis*, resurrection.

This is an annual 4 to 6 inches high, found in the deserts of Arabia, and in the arid wastes of Egypt, Palestine and Barbary; and not uncommonly on house tops and among rubbish in Syria. It has the peculiarity of contracting its rigid branches into a ball, which in this state is caught up by the wind and hurried from place to place until it is left in some moist situation, generally the sea shore, where it is driven to and fro by the land winds with the sand which forms the barriers of the beach along the coast. Here the seeds are expelled from the contracted seed vessels on the plant recovering its original form, and receive sufficient moisture for germination. It is then blown back by the westerly winds, in the deserts, where it puts out its shoots and grows in luxuriance. The Natives ignorant of these peculiarities attribute virtues to it. They believe that if it is put in water at the time when a woman first experiences the pains of child-birth, it will expand at the precise moment when the infant is brought into the world. It is called Kaf-marian, that is, *Mary's hand.* Some superstitious tales are told of it, among which it is said to have first bloomed on Christmas eve to salute the birth of the Redeemer, and paid homage to his resurrection by remaining expanded till Easter.—(*Lindley quoting Gardner's Chronicle*, 1842, *Loudon.*)

Mathiola incana, *R. Br. Stocks.* *Purple Gillyflower.*

Linn. Syst. *Tetradynamia.*

The seed.

Vernacular—Todree-Sufaid, *Punj.*, *Sind.*

A popular border flower.

In the Punjab and in Sind it is grown for its seeds, which constitute some of the several kinds of "*Todree*," reckoned aphrodisaic.—(*Dr. Stewart.*)

Cheiranthus cheiri, *Linn.* *Garden Wall-flower.*

Linn. Syst. *Tetradynamia.*

The seeds.

Vernacular—Todree Soorkh, Todree Soyah, *Punj.*, *Sind.*

Nasturtium officinale, *R. Br. Eng. Bot.* 855; *DC. Prod. i.* 137; *Griff. Itin. Notes,* 275. *Water Cress.*

Linn. Syst. *Tetradynamia Siliquosa.*

It is doubtful whether the water cress is indigenous in any part of India. It is however cultivated in gardens in Sind, Punjab, Deccan and Concans, and other parts of India Has been found at various elevations in the Punjab, Himalaya, and in Afghanistan.—(*Dr. Stewart, Grah., Griffith.*).

Notoceras canariense, *R. Br. Jacq. Ecl. t. iii.*; *Griff. It. Notes,* 230, *N.* 225; *Hk. Fl. Br. Ind. i.* 140. *Canary Notoceras.*

Linn. Syst. *Tetradynamia Siliquosa.*

A small, depressed, much-branched herb, with bipartite, adpressed pubescence; leaves linear, oblong, entire; flowers white, in racemes; racemes short, many-flowered; sepals equal, covered with strigose, adpressed hairs; petals equal, small, linear, oblong; pods 2-horned, ¼ in., subsessile, pubescent.

Common as a field weed and in moist places in Sind and the Punjab.

Farsetia jacquemontia, *H. F. & T. Journ. Linn. Soc. v.* 148; *Hk. Fl. Br. Ind. i.* 140.

Linn. Syst. *Tetradynamia Siliquosa.*

Vernacular—Furreed Bhootee, *Sind, Punjab.*

Perennial, erect, rigid, covered with bipartite, adpressed, strigose hairs, fixed by their middle; leaves linear, oblong, entire, ¼–1 in.; sepals strigose, acute; petals as long again as the sepals; flowers large, buds elliptic; pods narrow, linear, faintly 1-nerved.

Occurs commonly in sandy places in Sind, Punjab, Beloochistan and Afghanistan.

Farsetia ægyptiaca, *Turr*; *F. Edgeworthii. H. F. and T. Journ. Linn. Soc. v.* 147; *Hk. Fl. Br. Ind. i.* 140.

Characters like the last, but flowers larger; buds cylindric; sepals obtuse; pod elliptic, oblong, ½–¾ by ⅓–¼; flowers spicate, distant.

Found in Sind, Punjab Salt Range, Beloochistan (Much, Bolan Pass) and Afghanistan.

Dr. Stewart (*Punjab Plants*), quoting Edgeworth, says that both these species and *F. hamiltoni* have a pleasant pungent taste, are pounded and taken as cooling medicine, and are considered specific for rheumatism.

Malcolmia africana, *R. Br. Bocc. Sic. t.* 42; *DC. Prod. i.* 187; *Hk. Fl. Br. Ind. i.* 146. *African Malcolmia.*

Annual; 1½ ft.; stem branched, diffuse; branches spreading; leaves lanceolate, toothed, 1–6 in. petioled; down 2–4 parted; flowers small, subterminal; pedicles shorter than persistent calyx; silique rough.

Sind (in wheat fields) and Punjab.

Malcolmia strigosa, *Boiss. Fl. Orient. i.* 224; *H. F. and T. Journ. Linn. Soc. v.* 155; *Hk. Fl. Br. Ind. i.* 146.

Annual; depressed, hairy; leaves petioled, oblong, lanceolate, toothed; flowers lilac in racemes, sessile, numerous; pods 1–1½ in., long, terete, stout, thickened at the base and tapering to a point.

Sind, Punjab, Beloochistan and Afghanistan.

Sisymbrium irio, *Linn.*; *Eng. Bot.* 1631; *S. Irioides, Boiss. Fl. Orient. i.* 218; *Hk. Fl. Br. Ind.* 150. *London Rocket.*

Vernacular—Junglee Surson, *Sind.*

Annual or biennial; stem 1–3 ft., smooth, sometimes pubescent; leaves smooth, runcinate, pinnate, petioled; segments not auricled, remote, terminal, elongated; flowers yellow, minute, pedicelled; pods terete.

Sind, Kutch, Rajpootana, Punjab, Beloochistan (Bolan Pass), and Afghanistan. Seeds reckoned febrifuge.

Eruca sativa, *Lam.*; *Brassica erucoides. Roxb. Fl. Ind. iii.* 117; *Hk. Fl. Br. Ind. i.* 158. *The Rocket.*

Vernacular—Kala-Surson, *Sind.*

Cultivated extensively in Sind, Punjab, N. W. and Central Provinces.

Moricandia tortuosa, *H. F. and T. Journ. Linn. Soc. v.* 172; *Hk. Fl. Br. Ind. i.* 158.

Perennial; 1–2 ft. high; stem tortuose; leaves thick, elliptic, oblong, mucronate, entire or sinuate crenate; flowers few, erect, scattered along a lengthened raceme; petals pale, rose-colored, longer than the sepals; pods long, subcylindric; beak cyclindric, ⅛ in.

Sind and Punjab plains.

Isatis spartioides, *Edgw., MSS.*; *Dipterygium glaucum. Boiss. Fl. Orient. i.* 417; *Hk. Fl. Br. Ind. i.* 164.

A rigid, much-branched, glabrous shrub; leaves small, ovate-oblong, entire, ⅙–½ in. long, short-petioled; flowers subsessile, few, in bracteate racemes; pods ⅙ in., transversely wrinkled; drooping.

Upper Sind and the Punjab.

Physorhynchus brahvicus, *Hk. Ic. Pl. t.* 821; *Boiss. Fl. Orient. i.* 403; *Hk. Fl. Br. Ind. i.* 165.

Common in Sind, (Hubb,) and Punjab Salt Range.

N. O. 124. RESEDACEÆ,—*WELDWORTS.* Lind.

Ochradenus baccatus, *Boiss. Fl. Orient. i.* 422; *Hk. Fl. Br. Ind. i.* 182.

A much-branched shrub, 6–12 ft. high, with slender glabrous branches; leaves small, ½–1½ in., linear, in racemes; racemes rigid; flowers yellowish; calyx 5-partite; stamens 10–12; berry small white (yellowish white).

Sind and Punjab. Common on the hills.

Reseda pruinosa, *Delisle, Fl. Ægypt.* 152; *R. bracteata. Boiss. Fl. Orient.* 433. *Frosted Reseda or Weldwort.*

Linn. Syst. *Dodecandria Trigynia.*

Perennial; 1–1½ ft. high; leaves 1–2 in., linear; young leaves covered with large distinct blisters, as are also the branches above; upper leaves 3–5 partite, terminal, 6–9 in., dense; bracts minute, deciduous; flowers yellowish; capsules oblong, gaping.

Sind Hills, also the Punjab and Kutch.

Reseda aucheri, *Boiss. Fl. Orient. i.* 434; *Hk. Fl. Br. Ind. i.* 181.

Linn. Syst. *Dodecandria Trigynia.*

Perennial; branched; 1–2 ft. high, glabrous or papillose; leaves 1–2 in., tapering into a long petiole, obovate, spathulate or obtuse; flowers small, yellowish; other characters as in *R. pruinosa.*

Sind and Kutch, probably also in Rajpootana.

Reseda oligandra, *Edge. Journ. As. Soc. Calc. vii.* 764; *Oligomeris glaucescens. Camb. Jacq. Voy. Bot.* 23, *t.* 25; *Hk. Fl. Br. Ind.* 181.

Linn. Syst. *Dodecandria Trigynia.*

Annual; 6–12 in., much branched; branches erect; leaves 1–2 in. narrow, linear, fascicled; stipules subulate; flowers minute in terminal spikes, greenish white; capsules small, membranous, 4-lobed.

Upper Sind, Punjab, Beloochistan (Peerchowkee, mouth of Bolan), Concan.

N. O. 125. CAPPARIDACEÆ,—*CAPPARIDS.* Lind.—Bal. 16.

Cleome papillosa, *Stend. Nom. ed.* 2, *i.* 382; *Hk. Fl. Br. Ind. i.* 168; *Edge l. c. vi* 184. *Papillose Cleome.*

An erect-branched, hairy plant, 6–12 in. high; leaves 1–1½ in. long, ovate, cordate, obtuse, papillose, penninerved; lower long petioled, upper subsessile; bracts sessile, small; flowers minute, pinkish with a yellowish tinge; capsules 1–1½ in., subsessile, finely striate.

Sind, Punjab, parts of Mekran and Kutch, also in Beloochistan in the Bolan Pass, and it is not improbable is found also in Southern Afghanistan.

Cleome quinquenervia, *DC. Prod. i.* 239; *C. Noreana. Boiss. Fl. Orient i.* 413; *Hk. Fl. Br. Ind. i.* 168.

An erect plant, 6–12 in., with spreading branches; leaves suborbicular, 1 in. dia., palmately, 5-nerved, pubescent; flowers small, yellowish, in racemes; bracts subsessile; capsules 1–1½ × ⅙ in., sessile.

Rocky hills of Sind and Beloochistan.

Cleome stocksiana, *Boiss. Fl. Orient. i.* 414; *Hk. Fl. Br. Ind. i.* 169.

Perennial; branches erect, spreading, glabrous, glandular above; leaves 1 in., fleshy, ovate or obovate, obtuse, palmately, 3-nerved; petiole 1–1¾ in.; flowers small, purplish; stamens 6; capsules subsessile, broad, linear, pendulous, striate.

Sind, Kutch and Beloochistan. Covers the hill sides at Quetta with *C. quinquenervia.*

Cleome brachycarpa, *Vahl.*; *DC. Prod. i.* 240; *Hk. Fl. Br. Ind. i.* 169. *C. diversifolia. Hochst.* *Small-fruited Cleome.*

Perennial; 6–12 in., branched; leaves 3–5 foliolate; upper simple; leaflets petioled, linear; flowers minute, ¼–½ in. long, yellow, in leafy racemes; capsules scaberulous, ⅓ in. long.

Sind, Punjab, and N. W. India generally.

Cleome viscosa, *Linn.*; *Willd. iii.* 566; *Roxb. Fl. Ind. iii.* 128; *Hk. Fl. Br. Ind. i.* 170. *Polanisia viscosa. W. and A. Prod.* 22. *Viscid Cleome.*

Linn. Syst. *Tetradynamia Siliquosa.*

The seeds.

Vernacular—Hool-hool, Boogra, *Hind.*, *Punjab*; Kathoree, *Sind*; Choorai-ajwani, *Dec.*

Annual; erect, 1–3 feet; stems round, villous, viscid; leaves quinate and ternate; flowers ½ in. long, racemed, long pedicelled, yellow; capsule pubescent, round, 2–3½ in., striate; stamens 12–20; petals reflexed.

Sind, Punjab, Deccan, Concan, Ceylon, and Malabar.

The leaves have a considerable degree of pungency, but this is not durable on the tongue. The juice of the leaves is said to be useful in deafness. The plant is eaten in many parts of India as a potherb, and the seeds used for seasoning curries, &c. and are often substituted for mustard. In Southern India the seeds are considered anthelmintic and carminative, and used also as a vermifuge and sinapism.—(*Dr. Stewart, Roxb., Fl. Ind., Ainslie.*)

Gynandropsis pentaphylla, *Willd. iii.* 564; *Roxb. Fl. Ind. iii.* 127.

Linn. Syst. *Tetradynamia Siliquosa.*

The seeds.

Vernacular—Ghandoolee, Hool-Hool-sufaid, *Punj.*; Kinro, *Sind*; Kanalla, *Beng.*

Annual; erect, 1–2 feet high; stem round, hirsute; branches numerous, forked; young shoots hirsute; leaves alternate, petioled, quinate, digitate; floral leaves ternate and sessile; leaflets

sessile, obovate, acute, very finely serrate, hirsute on both sides; petioles channelled; racemes corymbiform; bracts short-petioled, ternate; flowers gynandrous, hexandrous, small, white, long-pedicelled; silique long, slender; seeds numerous.

Indigenous in the Punjab plains to 2,500 feet, and is plentiful throughout Sind, up to the borders of the Beloochistan hills, also in Western and Southern India. The seeds are said by Edgeworth to be officinal in the Punjab, being considered stimulant. In Sind under the name of Kinro they are used with other medicines to expel vermin from the hair. They are also prescribed in convulsions by Hindoo practitioners. The leaves ground and applied to the skin act as a rubefacient. Sir W. Jones observes that the sensible qualities of the plant seem to promise great antispasmodic virtues; it having a scent much resembling assafœtida, but comparatively delicate. The expressed juice is a popular remedy and in high repute as a local application in otalgia. The seeds yield a good fixed oil.—(*Roxb., Dr. Stewart, Ainslie.*)

Cratævia tapia, *Vahl.* *Garlic Pear.*

Linn. Syst. *Dodecandria Monogynia.*

The leaf.

Vernacular—Birmi, Kurwan, *Mahr., Hind.*; Varvunna, *Sans.*; Burna, *Punj.*

Found in Bundelkund, Rajpootana, Assam, Burma, and Bengal. It also occurs in the east of the Punjab, and is seen planted about wells, &c. west as far as Jhelum, and south to Mooltan.

In Peninsular India the root, bark, leaves, juice and seeds of this or allied species are used for various purposes. Aitchison states that at Jhelum the fruit is mixed with mortar to form a strong cement, and the rind used as a mordaunt in dyeing. The bark is bitter and tonic. The juice of the bark, though Buchanan states it to be useless, is prescribed by native practitioners in Southern India in intermittent and typhus fevers. An infusion of the fresh or dried leaves of *C. religiosa* is said to be slightly bitter and aromatic, and is used as a stomachic.—(*Loudon, Lindley, Brandis, Dr. Stewart, Pharm. of Ind., Ainslie, Cleghorn Punj. Report, Graham.*)

Cadaba farinosa, *Forsk*; *DC. Prod. i.* 244; *Hk. Fl. Br. Ind. i.* 173.

A slender, much-branched, hoary shrub, with ovate or oblong obtuse leaves, $\frac{1}{4}$–$\frac{1}{2}$ in.; flowers greenish-white in terminal corymbs; bracts subulate; fruit $\frac{1}{2}$–$1\frac{1}{2}$ cylindric; stamens 5.

Common in Sind and Punjab.

Cadaba heterotricha, *Stocks, Hk. Ic. Pl. t.* 839; *Hk. Fl. Br. Ind. i.* 173. *Powdery Cleome.*

Tree, 10–20 ft. high, glaucous, pulverulent; leaves 1 in. broad, obovate or orbicular; flowers in terminal corymbs; petals 4; limb suborbicular, equalling the claw; stamens 5; fruit 2–$2\frac{1}{4}$ in.; seeds globose; pulp yellowish-orange.

Sind and Mekranee Beloochistan.

Capparis aphylla, *Roxb.*; *DC. Prod. i.* 246. *Leafless Caperbush.*

Linn. Lyst. *Polyandria Monogynia.*

Vernacular—Kirrur, *Sind*; Karel, Kurreel, *Hind., Punj.*

An erect, thorny shrub, 10–12 feet high; leaves subulate on young shoots; stipules thorny, nearly straight; flowers corymbose, reddish; corymbs nearly sessile; fruit glabrous, long-beaked; bud pubescent; stamens 10 to 20.

Sind, Kutch, Rajpootana, Punjab, Guzerat, Concan, Deccan, Beloochistan at Sibi, and on the plains at Muskaff.

In Sind its upripe fruit is called "dhoro," and the ripe "pukkho," the flower buds "pussee." These last are eaten as a potherb, and pickled, both in Sind and the Punjab. Prepared with salt and pepper it is exported into Hindostan. The top shoots and young leaves are ground and applied as a blister in native pharmacy, also are very efficacious in relieving tooth-ache when chewed. Wood used for knees of boats on the Indus, also rafters and fuel. Weighs 54 lbs. per cub. ft. Sp. gr. ·864.—(*Brandis, For. Flo., Roxb., Dr. Stewart, Graham.*)

Capparis spinosa, *Linn.* *Common Caper.*

Linn. Syst. *Polyandria Monogynia.*

Vernacular—Kabra, Kaur, Kakree, Bussur, *Punj.*; Kalvaree, *Sind*; Kabra, *Afghanistan*; Kabbur, *Arab.*

A diffuse, prostrate shrub, armed with short, colored, recurved, stipular spines; young shoots covered with a ferrugineous tomentum; leaves thick, broad, ovate, mucronate, glabrous; peduncles one-flowered, solitary; flowers white, suffused with red; calyx four-leaved, deciduous; petals four, obovate; stamens long; stigma capitate; berry oval, many-seeded, reniform.

Indigenous in Sind, Punjab, Guzerat, N. W. Himalaya, ascending to 5,000 feet at Wangtu near Leh; 12,000 feet South Europe and Africa.

This is the plant which supplies "capers" in Europe. It is extensively cultivated in Toulon in orchards. As a pickle the flower buds are in great esteem throughout Europe and India. In Italy the unripe fruit is prepared in the same way as the flower buds; both are highly acrid and burning to the taste. In the Isles of the Mediterranean and near Toulon the flower buds are gathered just before they begin to expand. They undergo the same process of pickling in the Punjab.

In Sind, and in some parts of the Punjab, a compound of oil, mustard, fœnugreek, &c., is used in pickling capers. In Ladak the leaves are used as a potherb, and in Kangra the macerated roots are applied to sores.—(*Brandis, Roxb., Loudon, Lindley, Dr. Stewart.*)

Capparis horrida, *Linn.* *Thorny Caperbush.*

Linn. Syst. *Polyandria Monogynia.*

Vernacular—Ardanda, *Sind, Dec.*; Karveela, *Punj.*; Hunkaroo, *Sans.*

A common, scandent shrub; young shoots ferruginous, armed with stipulary, recurved thorns; leaves ovate, acuminate; peduncles 1–3 flowered; petals ciliate, pinkish; fruit obovate.

Sind, Punjab, Deccan, Bengal and Ceylon. The leaves are used as a counter-irritant.

Capparis sepiaria, *Linn.*; *Roxb. Fl. Ind. ii.* 568; *W. and A. Prod.* 26; *Brandis, For. Flo.* 13; *Hk. Fl. Br. Ind. i.* 177.

A spreading, much-branched, wiry shrub; young branches tomentose; leaves ovate-oblong or oblong-lanceolate, occasionally emarginate, pubescent beneath; flowers in simple umbels, small, white, sessile or on short peduncles; fruit a globose berry, 1-seeded, black when ripe.

Common in Sind, Punjab and the North-West generally.

Strœmeria tetrandra, *Vahl.*; *Roxb. Fl. Ind. ii.* 78; *Dalz. and Gib. Bom. Fl.* 9. *Cleome fructicosa. Linn.*; *Cadaba indica. W. and A. Prod.* 24.

Linn Syst. *Pentandria Digynia.*

Vernacular—Kodhab, *Sind, Hind.*

A large, straggling shrub; stem very small; branches numerous; extremities drooping; leaves alternate, short petioled, oblong, mucronate; stipules minute; flowers in terminal racemes, white; bracts solitary; calyx 4-leaved; petals 4; anthers oval, bipartite at the base; germ pedicelled; silique pendulous, many-seeded; seeds reniform.

Indigenous in Sind, Arabia, Concan, Deccan and Coromandel coast.

The leaves and root are considered deobstruent and anthelmintic, and are prescribed in decoction in uterine obstructions.

ALLIANCE 28. *MALVALES.*

N. O. 126. STERCULIACEÆ,—*STERCULIADS.* Bal. N. O. 31.

Bombax heptaphyllum, *Cav.*; *Willd. iii.* 732. *Silk Cotton Tree.*

Linn. Syst. *Monadelphia Polyandria.*

The gum—Mochurrus, and root—Sufaid Mooslie.

Vernacular—Seemul, Simul, *Hind.* The gum—Mochras. The root—Moosli, Somul.

This stately tree is indigenous throughout India and the warmer parts of Ceylon. It occurs wild in the Siwalick tract, occasionally up to 3,500 feet, and perhaps to beyond the Indus; also as high as 6,000 feet near the Ravi, and is not uncommonly planted in the plains as far as Mooltan. In Burmah and the outer Himalaya it attains a height of from 130 to 150 feet, with about 40 feet girth, with huge buttresses, projecting from its straight colossal trunk, and often 6 to 8 feet deep near the ground. In the Bombay Presidency it is common on the coast, and reaches a height from 80 to 100 feet;—leafless from October to March.

Dr. Waring (*Pharm. of Ind.*) states that to this tree two drugs, which hold a prominent place in the native materia medica, have been usually but erroneously referred:—

1. An astringent gummy exudation *Mochurrus*, which occurs in opaque, dark brown, knotty pieces, presenting a remarkable gall-like appearance, inodorous, and of a strongly astringent taste, containing a large proportion of tannic and gallic acids, which might doubtless be serviceably employed in cases requiring astringents. In this character Mr. Odoychund Dutt however pronounces it inferior to *Butea kino.* Its botanical source is unknown.

2. Dried roots, well known as *sufaid mooslie,* commonly sold in the bazaars in the form of shrivelled tubers of the thickness of a small quill, and from one to two inches in length; externally of a dirty buff color, inodorous, and of an insipid mucilaginous taste.

The roots known as Sufaid Mooslie, sold in the bazaars in Sind and the Punjab, are considered astringent and aphrodisaic, and are administered in gonorrhœa. A thick mucilage is formed with water, which would do well as a nutritious demulcent for convalescents. *Mochurrus* is given in conjunction with spices and other medicines in certain stages of bowel complaints; in diarrhœa and dysentery it is much prized by the natives, with the addition of an infusion of the cortex of *Punica granatum.* The bark of this tree is reported to be an emetic. In the Punjab the flower buds are eaten as a potherb, and the cotton as in other parts is used for stuffing cushions and pillows. It is found however not applicable for textile purposes, being too short-stapled, and also on account of its smoothness, and no adhesion existing between the fibres.—(*Birdwood, Dr. Stewart, Pharm. of Ind., Lindley, Loudon.*)

Eriodendron anfractuosum, *Linn.*

Linn. Syst. *Monadelphia Polyandria.*

The gum.

Vernacular—Suffaid Sumbul.

This tree in Ceylon is common up to 2,000 feet, and attains a height of from 50 to 60 feet, having a prickly base. The cotton, as of the last, is used for stuffing cushions, &c., and the gum "*Huttian*" is a popular remedy amongst natives for diarrhœa and dysentery. It is said that an oil is expressed from the seeds.—(*Wight, Drury.*)

Helicteres isora, *Willd. iii.* 721; *Roxb. Fl. Ind. iii.* 143. *East Indian Screw Tree.*

Linn. Syst. *Monadelphia Decandria.*

The follicles.

Vernacular—Moorudsing, Murorephulleo, *Hind.*; Dhameenee, *Dec.*; Vurkatee, *Sind.*

A shrub or small tree found in Bengal, Central India, the Deccan, Concan, and Malabar, and in the Punjab and Sivalick tract. From its singular-looking contorted capsule a liniment is prepared which is supposed to be a valuable application in cases of offensive sores inside the ears; and for this purpose is usually mixed with castor oil. On the "doctrine of signatures" which prevails in India, as it did in Europe some centuries ago, it is esteemed efficacious in colic and dysentery, being given in powder; also in bilious affections combined with other medicines. Sloane speaks of the juice of the root having virtues in empyema and stomach affections. The leaves in Jamaica are employed in making a decoction for glysters.—(*Dr. Stewart, Ainslie, Lindley.*)

N. O. 127. BYTTNERIACEÆ,—*BYTTNERIADS.* Lind.

Melhania abyssinica, *A. Rich. Fl. Abyss. i.* 76, *t.* 18; *Hk. Fl. Br. Ind. i.* 372; *Melhania ovata. Boiss. Fl. Orient. i.* 811. *Abyssinian Melhania.*

Linn. Syst. *Monadelphia Pentandria.*

Vernacular—Brahree, *Sind.*

A suffructicose plant; branches prostrate, spreading; leaves 1 × ¾, doubly serrate, or crenate-dentate, pubescent above, paler and tomentose beneath; bracteoles linear, shorter than the calyx; peduncles axillary, as long or longer than the petioles, 2–4 flowered; petals shorter than the sepals; flowers yellow.

Sind, in gravelly soil.

Melhania futteyporensis, *Munro, in Herb. Hook; Hk. Fl. Br. Ind. i.* 373. *Futteypore Melhania.*

Linn. Syst. *Monadelphia Pentandria.*

A small shrub, branches pubescent; leaves oblong 3 × 2 in., acuminate, serrate; base cordate, petioled; petioles 1 in.; stipules setaceous; bracteoles broad, equalling the calyx; margins recurved; sepals lanceolate, cuspidate; peduncles axillary and terminal, 2–4 flowered; flowers yellow; capsule ½ in. oblong, villous.

Sind, Punjab, and North-West India generally.

Melhania tomentosa, *Stocks, in Herb. Hook; Hk. Fl. Br. Ind. i.* 373. *M. abutiloides. Aitch. Cat Punj. Plants.*

Linn. Syst. *Monadelphia Pentandria.*

A tomentose shrub; leaves 2 × 1½, pubescent beneath, thinly stellate, hairy above, oblong-lanceolate, crenate-serrate, base rounded, petioled; peduncles 2–3 flowered, terminal, cymose; bracteoles oblong-lanceolate, cuspidate ½ in., margins *not* recurved; sepals ¾ in., oblong-cuspidate, tomentose; flowers small; capsule oblong, villous.

Sind hills, the Punjab, and Beloochistan (Nari river).

Melhania bracteosa, *Boiss. Fl. Orient. i.* 841. *M. Denhami, Br. Hk. Fl. Br. Ind. i.* 373.

Linn. Syst. *Monadelphia Pentandria.*

Suffructicose, cano-tomentose; branches spreading; leaves 1½ in., ovate-oblong, crenate-serrate, 5-nerved at base, stellate, hairy above, hoary-pubescent beneath, petioled; stipules setaceous; flowers yellow, peduncled; peduncles 3-flowered; sepals ovate-lanceolate; capsule spheroid, downy.

Sind, Beloochistan, and South Afghanistan at Goolistan.

N O. 130. MALVACEÆ,—*MALLOWWORTS.* Lind.—Bal. N. O. 30.

Althæa rosea, *Cav.; Roxb. Fl. Ind. iii. p.* 181. *Hollyhock.*

Linn. Syst. *Monadelphia Polyandria.*

The plant.

Vernacular—Goolkhyra, Khatmi. Root—Reshakatmee.

A herbaceous plant, 3 to 7 feet, with upright, hairy stems; leaves cordate, 5–7 angled, crenate, rugose; flowers axillary, sessile.

Cultivated in gardens for its flowers and seeds. The seeds are officinal, being mucilaginous, demulcent, diuretic, and febrifuge. The flowers are reckoned cooling and diuretic, and given in rheumatism. From Davies' trade report it would appear that 5 maunds of the seeds and 10 maunds of the flowers are annually imported from Afghanistan. The root is considered astringent and is prescribed in dysentery. The leaves are said to yield a blue coloring matter not inferior to indigo.—(*Dr. Stewart, Lindley.*)

Althæa Ludwigii, *L.; DC. Prod. i.* 437; *Cav. dis.* 2, *t.* 30; *Boiss. Fl. Orient. i.* 824; *Hk. Fl. Ind. i.* 319. *Ludwig's Marshmallow.*

Linn. Syst. *Monadelphia Polyandria.*

Annual; 6–12 in. high; branches prostrate; leaves cordate, smooth, 5–7 lobed; lobes wedgeshaped, 3-fid; bracteoles 7–9; pedicels axillary, clustered, 1-flowered; flowers whitish; petals longer than the sepals.

Common in Sind, Punjab, Beloochistan (Muskaff), and N. W. Provinces generally.

Malva parviflora, *Linn.; DC. Prod. i.* 433; *Boiss. Fl. Orient. i.* 820; *Hk. Fl. Br. Ind. i.* 321. *Small-flowered Marshmallow.*

Linn. Syst. *Monadelphia Polyandria.*

A small spreading herb, leaves roundish, obsoletely lobed, slightly pubescent; peduncles short; bracteoles linear; sepals broad, acute; carpels wrinkled.

Common in Sind, Punjab, Kutch, Bengal and N. W. Himalaya.

Malva rotundifolia, *Willd. iii.* 786; *DC. Prod. i.* 433. *Round-leaved Mallow.*

Linn. Syst. *Monadelphia Polyandria.*

The fruit and seed.

Vernacular—Chanderoe. The Seed and Fruit—Khabazi.

An annual; with herbaceous spreading stems; leaves cordate, roundish, obtusely lobed, crenate; pedicels in fruit drooping; petioles downy; flowers middle-sized, pale purple; carpels wrinkled.

Common in the Deccan, Guzerat, Punjab and Sind. Grows in the hills, appearing from September to February and March. The leaves being mucilaginous and emollient are employed as an external application in scurvy; and are also reckoned useful in piles. In some parts they are eaten as a potherb. The seeds are used in coughs and in ulceration of the bladder.—(*Honigberger.*)

Malva sylvestris, *W.*; *DC. Prod. i.* 432 *Common Mallow.*

Linn. Syst. *Monadelphia Polyandria.*

The flower and seed.

Vernacular—Goolkheir, *Hind.* Khitmee.

Found in the Punjab, Kashmere, and the Western Himalaya in waste places. Like the round-leaved and other species (the uniform character of which is to abound in mucilage), is without odour, and imparts its mucilaginous properties and taste to the water in which it is dissolved; and is useful in irritation of the skin, and for fomentation. The leaves are used as an emollient cataplasm. Dr. Royle states that either this or *Malva rotundifolia* was employed as an esculent vegetable by the Romans.—(*Lindley, Royle.*) Employed largely in the form of a decoction by native drug-sellers with the petals of *Rosa centifolia,* and sugarcandy in cases of strangury.

Sida nervosa, *Wall. Cat.* 1853; *S. humilis, DC. Prod. i.* 463; *Dalz. and Gibs. Bom. Fl.* 17; *Hk. Fl. Br. Ind. i.* 322.

Linn. Syst. *Monadelphia Polyandria.*

A trailing plant, leaves suborbicular, with a few scattered hairs, serrate; flowers axillary, solitary or twin.

A very variable species, found nearly throughout India.

Sida grewioides, *Guill and Perr. Fl. Seneg*; *Boiss. Fl. Orient. i.* 835; *Hk. Fl. Br. Ind. i.* 323.

Linn. Syst. *Monadelphia Polyandria.*

A pubescent undershrub; leaves oblong, ovate, obtuse, crenate, downy on both sides; stipules linear-subulate; peduncles solitary or twin; flowers small, yellow; carpels 7–8, wrinkled.

Occurs in Sind and the N. W. Provinces generally. Distributed in Arabia and Tropical Africa.

Sida carpinifolia. *L.*; *DC. Prod. i.* 460; *Hk. Fl. Br. Ind. i.* 323; *S. acuta, Burm.* *Hornbeam-leaved Sida.*

Linn. Syst. *Monadelphia Polyandria.*

An annual; with an erect stem 1½ feet high; leaves 2–3 in., oblong-lanceolate, acuminate, toothed, glabrous, underside sprinkled

with hairs; calyx-tube subglobose; carpels 5–9, rugose, awned; flowers yellow.

Common in Sind, the Punjab, and the hot parts of India generally.

The root, which is not unlike liquorice in appearance, is intensely bitter, and is prescribed in infusion in conjunction with ginger in cases of intermittent fever. It is considered a valuable stomachic and a useful remedy in chronic bowel complaints. In some trials made with it in Calcutta, it was found, when given in the form of an infusion, to promote perspiration, to increase the appetite, and in many respects to be a useful substitute for more costly bitters (*Beng. Disp.* p 215). The roots of other species of Sida, especially of *A. retusa*, are held in great repute by natives in the treatment of rheumatism. The leaves of the plant warmed and moistened with gingelly oil are employed to hasten suppuration.—(*Ainslie, Pharm. of Ind., Appendix to Markham's Travels in Peru, &c.*)

Sida cordifolia, *L.*; *DC. Prod. i.* 464; *Roxb. Fl. Ind. iii.* 177; *Dalz. and Gibs. Bom. Fl.* 17. *Heart-leaved Sida.*

Vernacular—Kharenti, *Punj.*; Burrayra, *Sind*; Kungyee, *Hind.* The seed—Beejbund, *Sind*; Hamaz, Chukai, *Punj.*

A suffructicose plant; leaves cordate-oblong, obtuse, crenate, pubescent on both surfaces; carpels beaked, 10-awned; awns longer than the calyx; flowers yellow.

Extremely common in the Concan, with *A. retusa*; also in Sind, Punjab, and N. W. India generally.

The seeds (Beejbund) are reckoned a specific for gonorrhœa and to be aphrodisiac. According to Bellew they are employed in the Punjab in colic and tenesmus.—(*Dr. Stewart.*)

Sida rhombifolia, *Linn.*; *DC. Prod. i.* 462; *Roxb. Fl. Ind. iii.* 176; *Hk. Fl. Br. Ind. i.* 323.

A very variable species. Common in Sind and nearly throughout India.

Abutilon indicum, *G. Don. Gen. Syst. i.* 504; *Sida Indica, L. DC. Prod. i.* 471; *Roxb. Fl. Ind. iii.* 179. *Indian Mallow or Rough-capsuled Sida.*

Linn. Syst. *Monadelphia Polyandria.*

Vernacular—Potaree, *Beng.*; Tootree, Potaree, *Hind.*; Sunbul, Peelee-bootee, *Punj.*, *Sind*; Kunghaye, *Dec.*

Generally seen as a shrub 2–3 feet high; leaves round, cordate, somewhat lobed, soft, velvetty, grossly serrate; pedicels erect, three times longer than petioles; corolla spreading; carpels numerous, truncate, tomentose; flowers yellow.

Found on the skirts of the Suliman range, and on the hills of Western Sind, Egypt, Bengal, and the Western Presidency.

The leaves of this plant are used in India as a substitute for *Althæa officinalis*. The root and leaves boiled with raisins and strained, make a pleasant diluent and demulcent. In Kandahar, &c they are stated by Bellew to be used as greens. The stems yield a good strong fibre for ropes.

Abutilon tomentosa, *W.*; *Roxb. Fl. Ind. iii.* 178. *A. muticum. G. Don.*; *Hk. Fl. Br. Ind. i.* 327.

Linn. Syst. *Monadelphia Polyandria.*

Vernacular—Burrayra, *Sind.*

An erect annual, with a shrubby stem; leaves alternate, petioled, reniform, tomentose, grossly serrate; peduncles axillary, 1-flowered; flowers bright yellow; capsules about 20, downy.

Sind, Punjab, Arabia, Deccan, Bengal, and the Malabar Coast.

From the stems of this is obtained a good strong and silky fibre used in Sind for making ropes.

Abutilon bidentatum, *Hochst. A. Rich. Fl. Abyss.*; *Hk. Fl. Br. Ind. i.* 326.

Perennial; suffructicose; leaves $2\frac{1}{2}$–3 × 2 in., downy on both surfaces, cordate-ovate, acuminate, crenate; stipules short; peduncles short, axillary; sepals ovate, acute; carpels 20, oblong, glabrescent, double the length of the calyx.

Common in Sind, Punjab, N. W. Provinces, Mekranee Beloochistan, Kutch, and at Sibi (Beloochistan).

Abutilon graveolens, *W. & A. Prod. i.* 56. *Sida graveolens. Roxb. Fl. Ind. iii.* 179.

Not unlike *A. muticum*; branches covered with clammy pubescence; leaves sometimes lobed, velvetty on both sides; carpels 20 or more.

Sind, Punjab, N. W. Provinces generally, Ceylon and Neilgherries, also Beloochistan.

Abutilon avicennia, *Gærtn.*; *Boiss. Fl. Orient. i.* 836; *Hk. Fl. Br. Ind. i.* 327. *Broad-leaved Sida.*

Annual; herbaceous; leaves roundish-cordate, 3–4 in., downy; peduncles 1 in., solitary, shorter than petiole; petals longer than the sepals, yellow; carpels 15–20 oblong, truncate, pubescent.

Sind, Punjab, N. W. P., and Bengal.

Abutilon fruticosum, *Guill. and Perr.*; *Boiss. Fl. Orient. i.* 836; *Hk. Fl. Br. Ind. i.* 328.

Suffructicose, covered with down; leaves small, ovate-cordate; peduncles axillary, solitary, 1–3 flowered; fruit cylindric.

Sind, and probably the Concan also.

Malachra capitata, *Linn.*; *DC. Prod. i.* 440; *Cav. dis.* 2, *t.* 33; *Hk. Fl. Br. Ind. i.* 329. *Headed Malachra.*

Linn. Syst. *Monadelphia Polyandria.*

Annual; stem rough with hairs; leaves 5–6 in. wide, bluntly angular, cordate, toothed; petioles 4 in.; stipules linear; bracteoles with a white spot at base; flowers yellowish or yellowish white in dense axillary or terminal heads; petals 5, longer than the sepals; sepals 5; carpels 5; 1-seeded.

Sind, Punjab, N. W. Provinces, Kutch, Bengal.

Urena lobata, *Linn.*; *DC. Prod. i.* 441; *Roxb. Fl. Ind iii.* 182; *Dalz. and Gibs. Bom. Fl.* 18. *Angular-leaved Urena.*

Herbaceous, hairy; leaves velvetty on both sides, rounded, angled, not divided beyond the middle, 5–7 lobed, 5–7 nerved on the undersurface, with 1–3 glands on the nerves; lobes obtuse; bracteoles oblong-lanceolate, equal to the expanded calyx; carpels densely pubescent, echinate; flowers rose-coloured.

Sind, and throughout the Western Peninsula in waste places. The fibres are considered a fair substitute for flax, as also are those of *A. sinuata* and *cordata.*

Urena cordata, *Heyne.*; *Pavonia glechomifolia. A. Rich. Fl. Abyss. i.* 54; *Hk. Fl. Br. Ind. i.* 331. *Glechomé-leaved Urena.*

A procumbent annual, more or less pubescent; leaves roundish-cordate, serrate, 3-lobed, glabrous; petioles 2 in.; flowers yellow, on slender axillary peduncles; bracteoles 5–6, variable in size and pubescence.

Sind, N. W Provinces, and the Western Peninsula.

Pavonia arabica, *Hochst. Boiss. Fl. Orient. i.* 837; *Hk. Fl. Br. Ind. i.* 331.

An erect perennial; stem and branches pubescent; leaves obcordate, oblong, nearly entire or slightly dentate; petiole as long as the leaf; flowers axillary; bracteoles 10–12, linear, villous, longer than the calyx and corolla; carpels 5, oblong, 3-sided, dehiscent.

Sind, and probably Kutch and Rajpootana.

Pavonia zeylanica, *Cav.*; *Roxb. Fl. Ind. iii.* 214; *Dalz. and Gibs. Bom. Fl.* 21; *Hk. Fl. Br. Ind. i.* 331. *Ceylon Pavonia.*

A herbaceous perennial; stem and branches hispid; leaves 1 × ¾ in., deeply 3-lobed, hispid, cordate; lobes lanceolate, dentate; flowers solitary, axillary; peduncles as long as petioles; bracteoles 8–12, ciliolate; carpels 5, oblong, 2-valved, 1-seeded.

Sind, N. W. Provinces, and Western Peninsula.

Pavonia odorata, *Willd.*; *DC. Prod. i.* 144; *Roxb. Fl. Ind. iii.* 214; *Hk. Fl. Br. Ind. i.* 331. *Fragrant Pavonia.*

Erect, herbaceous, covered with clammy pubescence; leaves 2½ × 3 in.; leaves cordate, roundish-ovate, 3–5 lobed, dentate; peduncles axillary, 1-flowered; flowers pink; carpels 5, obovoid, 2-valved, 1-seeded, unarmed, wingless.

Sind, N W. Provinces and the Western Peninsula, Burmah and Ceylon.

Pavonia ceratocarpa, *Dalz. in herb*; *Hk. Fl. Br. Ind. i.* 331. *Three-horned Pavonia.*

An undershrub, leaves 1½–2 × 1 in., oblong, rounded at the base, obtuse, irregularly toothed; petioles ¾ in.; flowers yellow, peduncled, axillary, and crowded at the ends of the branches; bracteoles 10, linear; carpels 5, woody, pyriform, 3-horned and with 4 linear basal appendages.

Sind, in waste places, flowering during July.

Pavonia propinqua, *Garcke*; *Boiss. Fl. Orient. i.* 837; *Hk. Fl. Br. Ind. i.* 332. *Two-spined Pavonia.*

Suffructicose, stellate-hairy; leaves oblong, sub-cordate, 1–4 in.; petioles shorter than the leaves; stipules linear, subulate; flowers peduncled, solitary, axillary, or crowded at the ends of the branches; bracteoles 10, linear-lanceolate, longer by ½ than the sepals; carpels woody, with 2 short prickles.

Sind, Beloochistan, and at Sagee in South Afghanistan.

Senra incana, *Cav. dis. ii.* 83, *t.* 35; *Hk. Fl. Br. Ind. i.* 334.

A downy undershrub; leaves orbicular, 3-lobed, long petioled, denticulate; stipules fugitive; peduncles shorter than the petiole; bracteoles 3, large, oval, cordate, membranous, free; calyx bell-shaped; sepals 5, lanceolate; petals 5, combined below, yellow or violet; capsule 5-valved.

Sind, and in the Bolan at N. Kirta, Beloochistan.

Hibiscus trionum, *L.*; *DC. Prod. i.* 453; *Boiss. Fl. Orient. i.* 840; *H. vesicarius, W. and A. Prod. i.* 48; *Dalz. and Gibs. Bom. Fl.* 19; *Hk. Fl. Br. Ind. i.* 334. *Bladdery Ketmia.*

A pubescent annual; lower leaves orbicular, toothed, undivided; upper 3-parted; lobes lanceolate, middle one very long; calyx 5-fid, membranous, with hispid, green nerves; bracteoles numerous, linear; flowers yellow with a purple spot; capsule oblong, obtuse.

Found over the greater part of India, Sind, Concan, Deccan, Punjab, Kutch, Western Himalaya, and Bengal.

Hibiscus furcatus, *Roxb. Fl. Ind. iii.* 205; *Dalz. and Gibs. Bom. Fl.* 19; *Hk. Fl. Br. Ind. i.* 335. *Forked-calyxed Hibiscus.*

Shrubby, very ramose, covered with soft down, and armed with sharp, thorny bristles rising from colored glandular tuberculi; leaves entire or 3-lobed, serrate, hairy; peduncles short, solitary, axillary, 1-flowered; bracteoles 10–12 linear, forked; flowers yellow, with a dark crimson bottom; capsule ovoid, hairy.

Sind, and nearly throughout India.

Hibiscus scindicus, *Stocks in Hook. Ic. Pl. t.* 802; *Boiss. Fl. Orient. i.* 839; *Hk. Fl. Br. Ind. i.* 336. *Sind Hibiscus.*

A much-branched, subspinous, hoary undershrub; leaves glandular, thinly bestrewn with stellate hairs (*Beloochistan specimens, pubescent*), retuse, toothed; stipules subulate; peduncles axillary, solitary, shorter than the leaves; bracteoles 6–8 linear, subulate; petals convolute; capsule globose, seeds with long wool.

Sind and Beloochistan—(specimens found in the Bolan in May 1880 less branched, more erect, and thickly pubescent).

Hibiscus intermedius, *A. Rich. Fl. Abyss. i.* 50; *H. Scandens. Dalz. and Gibs. Bom. Fl.* 20; *Hk. Fl. Br. Ind. i.* 336.

An annual; with reflexed prickly hairs; leaves polymorphous, irregularly toothed, 5–7 parted; lobes oblong, wedge-shaped at base; peduncles axillary; flowers yellow with a purple centre; sepals lanceolate, 3-nerved; capsule hispid, beaked; seeds hairy.

Sind, Kutch and Kattiawar.

Hibiscus Gibsonii, *Stocks, MSS.*; *Hk. Fl. Br. Ind. i.* 339. *Gibson's Hibiscus.*

An undershrub; branches bristly or with minute prickles; leaves 1–3 in., deeply palmately divided, oblong-lanceolate, serrate, glabrous; peduncles solitary, axillary; sepals 5-nerved; flowers yellow with a purple centre; capsule ovoid; seeds pilose.

Sind, Kutch, Punjab, Deccan, Concan, Beloochistan, and Afghanistan.

Hibiscus punctatus, *Dalz. Bom. Fl.* 20; *Hk. Fl. Br. Ind. i.* 340.

A suffructicose annual, with lax and stellately pubescent branches; glutinous, entire or 3-lobed, rounded ovate leaves; stipules minute, subulate; bracteoles 8–10 linear; flowers rose-coloured, axillary, solitary; capsule beaked, pilose.

Sind and the Punjab.

The five following are cultivated species :—

H. subdariffa, *L.*; *DC. Prod. i.* 453. *The Rozelle or Red Sorrel.*

The fleshy calyx and capsules make excellent tarts and jellies.

H. abelmoschus, *L.*; *DC. Prod. i.* 452; *Roxb. Fl. Ind. iii.* 202. *The Musk Mallow.*

H. rosa-sinensis, *L.*; *DC. Prod. i.* 448; *Roxb. Fl. Ind. iii.* 194. *The Shoeflower, or Chinese Hibiscus.*

Vernacular—Jasoon, *Hind., Dec.*

The leaves are considered emollient and slightly aperient, and the petals of the flowers are used for tinging paper as a substitute for litmus, as a chemical test. The flowers fried in ghee (clarified butter) are administered by natives for checking excessive menstruation.

H. mutabilis, *L.*; *DC. Prod. i.* 452; *Roxb. Fl. Ind. iii.* 201. *The Changeable Hibiscus.*

Hibiscus esculentus, *L.*; *DC. Prod. i.* 450; *Roxb. Fl. Ind. iii.* 211. *Edible Ochro.*

Vernacular—Bhendy, Ramtoorai, *Hind., Sind.*

The fresh immature capsules have a slightly mucilaginous taste and an herbaceous odour, much used as a vegetable, and esteemed for thickening soups. Medicinally the capsules are considered a valuable emollient demulcent and diuretic, and may be used with confidence in catarrhal affections and gonorrhœa. The purple juice of the stigmas, as of *H. rosa-sinensis,* communicates a bluish purple tint to paper, and forms also a substitute for litmus paper. The stems furnish good, strong, pliant fibres.—(*Roxb., Ainsley, Royle, Fibrous Plants.*)

Gossypium Stocksii, *Mast. Hk. Fl. Br. Ind. i.* 346. *Stock's Cotton Tree.*

Herbaceous, with straggling diffuse branches; leaves small, palmately, 3–5 lobed; lobes glabrous, oblong, obtuse; bracteoles laciniate; segments linear, lanceolate; flowers small, yellow; capsule ovoid; cotton yellow.

Sind, on limestone rocks. (A few at Clifton.) Hooker says it seems probable that this may be the wild form of the plant cultivated as *G. herbaceum*, and therefore the parent type of all the forms of Indian cotton.—(*Fl. Br. Ind.*)

Thespesia populnea, *Correa.* *Portia Nut Tree.*

Linn. Syst. *Monadelphia Polyandria.*

The fruit.

Vernacular—Pippul, Paris Pipul, Bhendy, *Hind.*; Paresh, *Beng.*; Paris, *Dec.*

This is a fast-growing tree, with cordate, long-acuminate leaves, generally met with in Ceylon and Western and Southern India. It is planted in gardens and on roadsides for shade. For the latter purpose it is now objected to, owing to the quantity of leaves it sheds. Two of these trees only are known to grow in the Punjab, at Kangar in the Mozuffurgur districts. In Sind it is not met with except in gardens, and seldom above 3 feet in girth and 25 feet high. The bright yellow viscid juice of the fruit of this tree is a little glutinous, somewhat resembling gamboge, and is employed as an external application in cutaneous affections. A decoction of the bark is used as a wash to the affected parts. In Ceylon the yellow pigment is used as a dye.—(*Ainslie, Dr. Stewart, Brandis.*)

N. O. 131. TILIACEÆ,—*LINDENBLOOMS.* Lind.—Bal. 33.

Corchorus olitorius, *Linn.* *Bristly-leaved Jews' Mallow.*

Linn. Syst. *Polyandria Monogynia.*

Vernacular—Singin Janascha, *Hind.*; Pāt, *Beng.*; Bun-pāt, *Sind, Punj.*

An erect annual, seldom rising above 3 feet; leaves petioled, alternate, ovate, acuminate, serrate; lower serratures setaceous; flowers small, sessile, solitary, yellow; capsule nearly cylindrical, 10-ribbed, 5-celled, with transverse partitions; seeds numerous, dark brown.

Found wild in the Punjab and Sind; cultivated in the Peninsula, Bengal and Madras. As seen in the Mediterranean region, is an herbaceous annual plant, only a foot or two in height. From the fine long silky fibres of the bark of this plant, paper, a coarse cloth called Tāt, and ropes are made; also from those of *C. capsularis*, a species easily distinguished from this by its seed-vessels being globular, instead of elongated and cylindrical. The stems and stalks of the jute are also utilised in making charcoal for gunpowder and fireworks; for the making of baskets, and for enclosures, &c. According to some experiments made by Dr. Roxburgh, the breaking weight of the dry and wet fibres of *C. capsularis* from China are given as 164 lbs.; *C. olitorius*—dry 113 lbs., wet 125 lbs. After 116 days' maceration, and tanned, the former broke at 49 lb., and the latter at 50 lbs. In Sind the fibres of the above, *C. tridens* and *fascicularis* are used for making ropes.—(*Loudon, Lindley, Dr. Stewart, Royle Fib. Pl., Ainslie, Stocks.*)

Corchorus trilocularis, *Linn.*; *Willd. ii.* 1215. *Three-celled Corchorus.*

Linn. Syst. *Polyandria Monogynia.*

Vernacular—Baphulee. The seeds, Isbund, *Sind, Hind., Punj.*

An erect annual; with lanceolate, serrate leaves, lower serratures setaceous; stipules ensiform; flowers peduncled; capsules filiform, 3-celled, 3-valved, 3-cornered; angles bifid, scabrous; apex obtuse.

Found in Arabia, Sind, Punjab, Bengal, and Burmah. The plant macerated for a few hours in water yields a mucilage which is prescribed as a demulcent, and the seeds as a specific in rheumatism. From the fibres good rope is manufactured.

Corchorus humilis, *Munro. C. Antichorus. Rœusch. Hk. Fl. Br. Ind. i.* 398.

Linn. Syst. *Polyandria Monogynia.*

The plant.

Vernacular—Moodheeree, *Sind*; Baphulee, *Hind.*

A procumbent annual; with many toughish expanding branches; leaves oblong, serrate; petioles slender, as long as the leaves; flowers in *laterifolius,* solitary, small, yellow, sub-sessile; calyx four-cleft; leaflets lanceolate, expanding, same length as the corolla; capsules cylindric, obtuse-pointed, contorted, four-ribbed, many-seeded.

Extremely common in Sind and the Punjab. Is a camel fodder plant. Like the last is very mucilaginous. Mucilage used as demulcent, and prized by the natives of Sind as a remedy in gonorrhœa.

Triumfetta rotundifolia, *Plum.* *Round-leaved Triumfetta.*

Linn. Syst. *Dodecandria Monogynia.*

An annual, 2–4 feet; leaves round, serrated, tomentose; flowers numerous, small, yellow; petals five.

Occurs in Sind, Punjab, and Bengal. From the bark of the species under notice good fibres could be got by the usual process, but are not considered of sufficient strength for the manufacture even of ropes.

The mucilaginous and astringent properties of the leaves and fruits of certain Triumfettas called *Carapixo de calcada* in Brazil, which grows everywhere in that country, especially on the roadside and in the vicinity of dwellings, render them serviceable in injections for inveterate gonorrhœa.

The seeds of *T. angulata,* a species occurring in the plains of the Punjab, are eaten as a potherb in times of famine.—(*Lindley, Dr. Stewart, Loudon.*)

Triumfetta semi-trilobata, found in the West Indies, has a tough strong bark, which serves for rope-making, &c. in the inland parts.

Grewia asiatica, *Linn.*; *W. and A. Prod.* 79. *Asiatic Grewia.*

Linn. Syst. *Polyandria Monogynia.*

The bark.

Vernacular—Phalso, Pharoah, *Sind, Punj.*; Shukree, *Beng.* The bark—Phalsa-ke-chhal.

A small tree 10 or 12 feet high; with leaves 3 to 7 inches long, oblique or round-cordate, serrate, downy, with 5–7 arching nerves

proceeding from the base; stipules linear-lanceolate; petioles ½ in. long; peduncles axillary, longer than petioles; drupes round, 1–2 nuts.

Cultivated in the Punjab plains, Sind, Guzerat, and other parts of India. Said to be wild in the Deccan (Poona Districts).—(*Dalz. and Gibs.*) Its fruit has a pleasant acid taste, and is much eaten. A spirit is said to be distilled, and a pleasant syrup (sherbet) made from it. The leaves and buds are officinal, an infusion of the bark is used as a demulcent.—(*Dr. Stewart.*)

Grewia populifolia, *Vahl.*; *DC. Prod. i.* 511; *W. and A. Prod.* 80.

Linn. Syst. *Polyandria Monogynia.*

Vernacular—Gango, *Sind*; Ganger, *Punj.*

A shrub; branchlets with short stellate hairs; leaves variable in form, broad-ovate, short-acuminate, dentate or irregularly serrate, rough, 3–5 nerved; peduncles solitary or twin, 1–3 flowered; flowers large, white; sepals ½–¾ in. long; drupe 2-lobed, shining with a 2-celled stone.

Common on the hills in Sind, the arid tracts of the Punjab, the Trans-Indus, and Salt Range to 3,000 feet. Also in Egypt, Arabia, Rajpootana, Afghanistan, and N. W. Himalayas. The fruit like the preceding is pleasant, and is eaten in Sind and the Punjab.

Grewia salvifolia, *Heyne*; *W. and A. Prod. i.* 77.

Linn. Syst. *Polyandria Monogynia.*

Vernacular—Bathur, Gargas, *Punj.*; Bihul, *Sind.*

A tree 16–20 ft.; leaves lanceolate, 2–3 inches long, margin entire, serrate, 3-nerved, hoary underneath; petioles ¼ inch long; stipules lanceolate, longer than petiole; peduncles axillary, 2–3 flowered; flowers yellow; petals obovate, bifid; drupes round.

A shrub or small tree 16 to 20 feet high, found in Sind, Punjab, the Peninsula, and Central Provinces. The fruits are small, not succulent, subacid, and eaten by the natives.—(*Brandis, Dr. Stewart, Stocks.*)

Grewia villosa, *Willd.*; *Dalz. and Gibs. Bom. Fl.*; *DC. Prod. i.* 512; *Hk. Fl. Br. Ind. i.* 388; *Brandis, For Fl.* 37.

A shrub; with rugose, villous, suborbicular leaves 1–3 in. long, 5-nerved, nerves and serratures villous; flowers nearly sessile in tufts, yellow; drupe, globose, 4-stoned.

Sind, Punjab, and Western and Southern India. The fruit is eaten.

N. O. 133. POLYGALACEÆ,—*MILKWORTS.*

Polygala abyssinica, *Fres.*; *Hk. Fl. Br. Ind. i.* 202. *Abyssinian Milkwort.*

Linn Syst. *Diadelphia Octandria.*

Perennial; stems erect, glabrous; branches numerous, slender, twiggy; leaves narrow, linear, acuminate, subsessile; racemes terminal, slender, lax-flowered; bracts ovate; flowers ¼ in. long, secund or subsecund; wings petaloid, obtuse, nerved, membranous; capsules obovate; seeds densely hairy.

Upper Sind, at Sukkur, also Punjab and Afghanistan.

Polygala Hohenackeriana, *Var stocksiana. Boiss. Fl. Orient. i.* 472; *Hk. Fl. Br. Ind. i.* 202.

Linn. Syst. *Diadelphia Octandria.*

Perennial; with hoary diffuse branches; leaves hoary or glabrous, oblong lanceolate; racemes subsessile, dense-flowered, terminal; flowers drooping, ¼ in. long, on short pedicels; bracts small; margins of sepals broad, scarious; capsule ⅙ in., glabrous, orbicular with a broad membranous wing; wing elliptic obtuse.

Upper Sind, at Shikarpoor, and Sukkur; also Punjab, Beloochistan, and Afghanistan.

Polygala erioptera, *DC. Prod. i.* 326; *Hk. Fl. Br. India i.* 203. *Woolly Milkwort.*

Linn. Syst. *Diadelphia Octandria.*

An erect annual, (sometimes decumbent,) with numerous spreading branches; leaves ⅓–1 in. long, obovate; racemes axillary, short, few flowered; flowers on slender pedicels; bracts minute; wing membranous with a midrib, obliquely oblong.

Sind, Punjab, N W. Provinces, and the Western Peninsula generally, with *P. chinensis,* Linn., a very variable species with orbicular oblong, or obcordate to narrow linear leaves.

ALLIANCE 29. *SAPINDALES.*

N. O. 136. SAPINDACEÆ,—*SOAPWORTS.* Lind.—Bal. 48.

Sapindus emarginatus, *Linn.*; *Roxb. Fl. Ind. ii.* 279. *Soap Berry.*

Linn. Syst. *Octandria Monogynia.*

The fruit and kernel of the seed.

Vernacular—Reeta, Arishta, Ahrayta, *Hind., Dec.*

Indigenous in the Circars, Mysore, Bengal, and Bombay, and cultivated in the North-West Provinces. The capsule which covers the black seed has in its succulent state a very singular sweetish bitter taste, and a smell not unlike that of an over-ripe mango. By the Vytians it is considered a valuable expectorant, and is prescribed in humoral asthma. The kernel of the seed is prescribed as a febrifuge, and the capsule when bruised and agitated in water produces "suds" like soap, and is used by natives for washing their heads, and woollen and silk articles; but it must be used with prudence, being somewhat corrosive and destroying the fibre. A small quantity of these "suds" put in the mouth of a person suffering from an epileptic fit, succeeded (according to Dr. Sherwood) in abating the paroxysm; a tincture of the capsules has been recommended in chlorosis.—(*Lindley, Loudon, Ainslie.*)

Dodonæa burmanniana, *DC.*; *W. and A. Prod.* 114.; *Wight, Ill. t.* 52.

Linn. Syst. *Octandria Monogynia.*

Vernacular—Ban-mendoo, Mandoo, *Punj.*; Sanatha, Aliar, *Sind.*

An evergreen shrub 10 to 15 feet; leaves viscid, alternate, short-petioled, linear, lanceolate, sub-sessile, coriaceous and shining; margins revolute; flowers greenish, in short terminal racemes or panicles; capsules membranous, winged, 3-celled.

Common in the lower hills of North-East Afghanistan, the Trans-Indus, Sind, Beloochistan, and Punjab Occurs frequently in the Salt Range, and ascends to 4,500 feet in the Himalaya. Is found also in Central India and Ceylon, Deccan, Coromandel Coast, Arabia, America, and Java. It is well suited for hedges, for which it is used, and generally called "Bog-myrtle." Tool handles are made from the wood, and its tough branches are used as supports for mud roofs.—(*Dr. J. Stewart, Brandis, For. Flo., Roxb. Flo. Ind.*)

Cardiospermum halicacabum, *Linn.*; *W. and A. Prod. i.* 109; *Dalz. and Gibs. Bom. Fl.* 34. *The Balloon Vine, or Smooth-leaved Heart Pea.*

Linn. Syst. *Octandria Trigynia.*

An annual climbing plant, remarkable for its inflated membranous capsule; branches slender; leaves ovate, deeply cut, 1½–3 in.; flowers white, ⅛ in.

Common in hedges, &c. in Sind, Punjab, N. W. Frontier, and throughout India nearly.

The seeds are officinal, and the root is considered by native practitioners diaphoretic, diuretic and aperient. It is mucilaginous, and imparts this property to water, rendering it nauseous to taste; in this form it is administered in fevers, &c. On the Malabar Coast the leaves are given in pulmonic complaints.—(*Lindley, Loudon, Ainslie, Dr. Stewart, Graham, Royle.*)

N. O. 139.—MALPIGHIACEÆ,—*MALPIGHIADS.* Lind.—Bal. 45.

Hiptage madablota, *Gærtn.*; *DC Prod. i.* 583; *W. and A. Prod.* 107; *Hk. Fl. Br. Ind. i.* 148. *Clustered Hiptage.*

Linn. Syst. *Decandria Monogynia.*

Vernacular—Hutheomookta, *Hind.*

A large climber, with stout branches; leaves 4–6 in., oblong or ovato-lanceolate, coriaceous, petioled, polished, 4–6 nerved; racemes axillary or terminal; flowers fragrant, white; sepals obtuse; carpels with a central wing between the two lateral.

Sind, Kutch, Deccan, and Concan The bark is said to be a good sub-aromatic bitter.—(*Graham.*)

ALLIANCE 30. *GUTTIFERALES.*

N. O. 144. CLUSIACEÆ,—*GUTTIFERS.* Lind.—Bal. 42. *Guttiferæ Juss.* Gen. 243.

Garcinia purpurea, *Roxb.* *Kokum Butter Tree.*

Linn. Syst. *Dodecandria Monogynia.*

The fatty oil of the seed, and the rind of the fruit.

Vernacular—Brindao, *Goa*; Kokum, *Hind.* The oil—Kokum-ke-tail.

An elegant tree, a native of the Concans, Malabar, and other parts of the Madras Peninsula. The fruit has a pleasant though sour taste, containing an acrid purple pulp, in which are lodged as many as eight seeds, reniform, somewhat crescent-shaped or oblong. It is mentioned by Garcia d'Orta (1563) as known to the Portuguese by

the name of "Brindoa," and used in dyeing; the peel serving as it now does in the Concans, Deccan, Madras, and other parts of India to acidulate curries. It is considered superior to tamarind, and in Goa it has the preference The seeds yield about 10 per cent. of a concrete oil by exposure to the sun for some days till dry, then bruised and boiled; the oil appears on the surface, and on cooling concretes into a solid cake. This oil, or butter, melts at 98° Fahr., and is used by unprincipled vendors to adulterate *ghee*. When kept too long it becomes rancid, and an efflorescence of shining tufted crystals appears on the surface of the mass. It might be advantageously employed in candle-making, as it yields a purer stearic acid than tallow and most other fats. In the preparation of ointments, &c. it would be found an excellent substitute for spermaceti. As a salve for ulcerations, chapping or fissures of the lips and hands, &c. it is commonly used with benefit.—(*Birdwood, Ainslie, Pharm., Pharm. of India.*)

Hebradendron cambogoides, *Graham.*

Linn. Syst. *Monœcia Monadelphia.*

The gum resin—Gamboge.

Vernacular—Rawundchence Seera, *Hind.*; Rawul, *Sind.*

This tree grows in Siam, Cambogia, and Ceylon, and yields the gamboge of commerce. It is stated by Murray (app. 46–110) to have been introduced to the notice of Europeans by Clusius, who received it from Dutch Admiral Van Neck, on his return from China, under the name of Ghittacimou in 1603. The place of production of the drug was first made known in 1658 by Bontius (*Hist. Nat. Ed. Med. Ind. Orient*). Besides this species there is probably another (*Garcinia pictoria*), the exudation of which is used as a substitute for either the Ceylon or Siam kind; and, according to Dr. Roxburgh, is superior in color even in its crude state. *G. travancoria* according to its discoverer Lieut. Beddom (*Flora Sylvatica*, Madras, part XIV) also yields an abundance of bright yellow gamboge. Gamboge is also obtained from *G. elliptica* (*Wall*). Two kinds, the Siam and the Ceylon, are known in commerce; the former commonly occurs in cylinders, either solid or hollow, whence it is called "Pipe gamboge." The Ceylon gamboge is found in the bazaars of India, but is seldom met with in Europe. The composition and characters of gamboge are of considerable importance, in consequence of death having occurred in some instances from its administration. It consists principally of resin or gambogic acid (70 per cent) and gum and water (30 per cent). The acid is not soluble in water but freely in alcohol, forming a liquid of a fine yellowish-red, and of neutral or very slightly acid reaction; and will impart its color to 10,000 times its weight of water. The latest analysis of the different kinds of gamboge is by Dr. Christison:—

Pipe Gamboge of Siam.		*Cake Gamboge.*		*Ceylon.*	
Resin	72·2	Resin	64·8	Resin	75·3
Arabin	23·0	Arabin	20·2	Arabin	18·3
Moisture	4·8	Fecula	5·6	Cerasin	0·7
		Lignin	5·3	Moisture	4·8
		Moisture	4·1		

Gamboge is a valuable hydragogue-cathartic and anthelmintic. In dropsical affections it is a remedy of established value, and in obstinate amenorrhœa has been successfully administered. A native prescription for diarrhœa is—gamboge, opium and syrup of (*Gool kheira*) mallow flowers, or of roses.—(*Pharm., Edin. Disp., Nevin's Pharm., Ainslie, Royle.*)

Mesua ferrea, *Linn.*

Linn. Syst. *Polyandria Monogynia.*

The dry flower bud.

Vernacular—Nagkaysur, *Beng., Hind.*; Nag-chumpa, *Dec.*

This elegant tree was first noticed by Van Rheede. It grows in Ceylon, Malabar, Bengal, Java and Burmah.

The dried flower buds constitute the Nagkaysur of the bazaars. They are supposed

to possess mild stimulant properties, but are chiefly valued as a perfume, and for dyeing silk. The expressed oil of the seeds, according to Dr. Ross, is much employed by the people of North Canara and Bengal as an antidote for snake poison, and as an embrocation in rheumatism. The bark and roots are considered to be, in infusion, an excellent tonic bitter.—(*Lindley, Loudon, Pharm. of Ind., Asiat. Researches.*)

Calophyllum inophyllum, *Lind.* *Sweet-scented Calophyllum.*

Linn. Syst. *Polyandria Monogynia.*

The flowers dried, and the leaves, and resin.

Vernacular—Surpunka, Sultan-champa, *Hind.*; Oondee, *Dec.*; Purreya, Duggerfool, *Sind.*

A tree indigenous to Malabar, the Madras Peninsula, the Concan and Deccan. Ainslie (*Mat. Indica*) states he is somewhat inclined to think that this is the tree which Alexander's army found growing in the country of the Gadrossi (the present Mekran, which lies betwixt the province of Kerman in Persia and Sind), and which Arrian describes as resembling a laurel with white blossoms of a most delicious odour, and hence perhaps the English name of Alexandrian laurel; from the bark of which, as also from the roots, exudes a resin which is supposed by some authors to be the *Tacamahaca* of the Isle of Bourbon. True East Indian Tacamahaca is said by Dr. Lindley to be the produce of *C. calaba*; and Maynas resin is referred to the same species. Barham in his *Hortus Americanus* (p. 18) extols the virtues of this resin, which he says is of great efficacy in healing wounds. The kernels of the nuts have a bitterish and, when ripe, a somewhat unctuous taste, from which is prepared a grateful-smelling fixed oil, held by natives in high esteem, as an external application in rheumatism. Used also in some parts, as in Travancore, where it is largely manufactured, for burning in lamps.—(*Lindley.*)

N. O. 147. REAUMURIACEÆ,—*REAUMURIADS.* Lind.—Bal. N. O. 41.

Reaumuria hypericoides. *W.* *Hypericum-like Reaumuria.*

Linn. Syst. *Polyandria Pentagynia.*

Vernacular—Laneesah, *Sind.*

A small cæsious plant, with narrow glaucous leaves which are alternate; stipules none; calyx pentapartite, covered with imbricated bracts; petals 5, hypogynous; stamens hypogynous; carpels 2–5; ovules 2–4, ascending; flowers lilac; fruit capsular, 2–5 valved; seeds shaggy.

Indigenous in Sind, Arabia, Syria, the Mediterranean coast, the Salt plains, and in the milder parts of Northern Asia. The plant contains an abundance of saline matter, which circumstance is doubtless attributable to the situations in which it grows. It is used in Sind in the cure of porrigo or itch, the bruised leaves being applied externally, and a decoction of 2½ to 3 oz. of the juice of the leaves diluted and internally administered.—(*Lindley, Veg. King.*)

ALLIANCE 31. *NYMPHALES.*

N. O. 148. NYMPHÆACEÆ,—*WATERLILIES.* Lind.—Bal. 10.

Nymphæa pubescens, *W.* *Indian or Egyptian Lotus.*

Linn. Syst. *Polyandria Monogynia.*

The root.

Vernacular—The plant—Koonee, *Sind*; Burro, Shaluk, *Beng.*; Kawal Zutto, Bombhur, *Hind.*; Kummul, *Bombay*; Nelofir, *Pers.* The root—Lorh.

A native of Egypt and Africa, common throughout India in tanks, pools, &c. In Sind the tubers are eaten raw, roasted and boiled. Dr. Stocks (*Sind Selections*, part II) in regard to the root (Lorh) and that of *Nelumbium speciosum* (Beh) remarks that they are of great importance. They produce a considerable revenue, and are chiefly collected about Lake Munchur, and are much esteemed by natives. They are enumerated in an old Sind prophecy, together with *Fish* as the three things which the opening of a particular line of canal would produce to the inhabitants along its banks. Ainslie says "the tuberous root of the *N. pubescens*, which is in its nature mucilaginous, is amongst the medicines which native practitioners prescribe internally for piles in the form of powder."

N. O. 150. NELUMBIACEÆ,—*WATERBEANS*. Lind.—Bal. 11.

Nelumbium speciosum, *W.* *Indian Sacred Bean.*

Linn. Syst. *Polyandria Polygynia.*

The root, stalks cut up, and seed.

Vernacular—The plant Pudma, Kummal, Kungwel, *Hind.*; Pubbun, *Sind*; Bakla-koobtee, Nelofir, *Pers.*; Pamposh Kammal, *Punjab.* The seeds—Doda, Paboora, *Sind*; Kawulgotee, *Punj.* The root—Beh, *Sind.*

Aquatic; leaves suborbicular, peltate, glabrous, margins waved; petioles of various lengths; peduncles radical, 1-flowered, erect, longer than petioles; corolla polypetalous; anthers linear; fruit turbinate in a truncate disc, hollow; nut ovate; flowers white or rose-coloured.

A native of India, Ceylon, Persia, Cochin-China, Siam, the Phillipines, China, and Japan, and some parts of the Russian empire.

Both the root and seeds of this plant are esculent, sapid, and wholesome. The fruit of this species is believed to have been the "Egyptian Bean" of Pythagoras, and the flower, that mythic Lotus which so often occurs on the monuments of Egypt and India. From the roots of the Nelumbo Sir George Staunton says the Egyptians are supposed to have prepared their Colocasia. It is common in tanks and marshes in the plains up to Peshawur, is abundant in Kashmere (5,000 feet), and occurs at Moozaffurabad, &c. The sliced roots are sold as food, and used cooked or as pickle. Moorcroft states that in Kashmere the stalks are also eaten as a vegetable; the broad leaves are used as plates, the flowers as offerings, and Bellew mentions that in the Peshawur Valley they are used in sherbets. The seeds are used as food and are considered medicinal, being given to check vomiting; and also as a diuretic and refrigerant to children. According to Moorcroft this plant supports 5,000 people for eight months of the year. Nuttall states that the tubers of *Nelumbium luteum* resemble those of the sweet potato, are as farinaceous and agreeable when boiled, and are used as food by the American Indians. Endlicher says the milky viscid juice of the leaf and flower-stalks is employed as a remedy in diarrhœa, and that the petals, which smell like anise, are slightly astringent and used like rose-flowers.—(*Lindley, Loudon, Ainslie, Hook. and Thomson, Graham, Dr. Stewart.*)

Nelumbium cæruleum, *Fisch.* *Blue-flowered Sacred Bean.*

Linn. Syst. *Polyandria Pologynia.*

The flower.

Vernacular—Kummul, *Hind.*; Neelofur, *Pers.*, *Sind.*

A variety of the preceding. A native of lower Egypt, where it is held sacred. Frequent in the ponds and tanks in Sind, and used indiscriminately with the other nelumbiums.

ALLIANCE 32. *RANALES.*

N. O. 151. MAGNOLIACEÆ,—*MAGNOLIADS.* Lind.—Bal. 3.

Illicium anisatum, *W.* *Star Anise.*

Linn. Syst. *Polyandria Polygynia.*

The capsule—Star anise.

Vernacular—Buddiankattai, Anasfool, *Hind.*; Badhian, *Sind.*

Described by Thunberg in his *Flora Japonica*, and by Loureiro also, who gives nearly the same description of the plant. Gærtner in his *De plantarum universalis* in speaking of it calls it *Zingi fructus stellatus*, and Ainslie says no name could be better applied. The whole plant of *Illicium anisatum*, especially the fruit, has a pleasant aromatic flavour of anise, or rather more like that of fennel, sweetish, and rather pungent. The fruit as found in the bazaars exactly resembles stars in shape with six or eight points, leather-like, and generally about the size of a six-pence. It is reckoned a stomachic and carminative in China, Japan, and throughout India; and is used in seasoning. By distillation it yields an oil having the properties of anise, for which it is often substituted.

N. O. 152. ANONACEÆ,—*ANONADS.* Lind.—Bal. 4.

Anona squamosa, *W.* *Sweet Sop. Custard Apple.*

Linn. Syst. *Polyandria Polygynia.*

The dried fruit (immature) wild.

Vernacular—Seetaphul, *Hind., Dec.*; Ata, *Beng.*; Sharifa, *Punj., Sind.*

A well-known native of the West Indies now generally cultivated in India. It grows wild in the Deccan up to Sholapoor. In the Punjab it is cultivated as far north as Gordaspoor. In Sind it is also cultivated, but the fruit is inferior. From December to May the tree is almost leafless. The fruit ripens from July to October. Bruised and mixed with salt and applied to malignant tumours, it has the effect of hastening suppuration. The leaves have a heavy disagreeable odour, and the seeds contain a highly acrid principle said to be fatal to insects, for which purpose the natives use them. The dried immature fruit powdered with the flour of gram (*Cicer arietinum*) is used also for washing the hair with the object of destroying vermin. In prolapsus ani of children an infusion of the leaves proves serviceable.—(*Birdwood, Dr Stewart, Brandis, For. Fl., Ainslie.*)

N. O. 154. RANUNCULACEÆ,—*CROWFOOTS.* Lind.—Bal. 1.

Helleborus niger, *W.* *Christmas Rose.*

Linn Syst. *Polyandria Polygynia.*

The root—Black Hellebore.

Vernacular—Kalee-kootkie, *Hind., Dec.*; Kartick, *Arab.*

A low perennial herb, native of Sub-Alpine Europe and Nepaul, is also found in Provence, parts of Northern Italy, and Continental Greece. Under the name of Christmas Rose it is much grown as a garden flower. The rhizome, which is employed as a drug, is knotty, fleshy and brittle, and of a blackish brown color. It is nauseous, bitter and acrid, and has been successfully used in maniacal and dropsical cases, worms and psora. In large doses it is a drastic purgative, and in small, diuretic and emmenagogue. In Sind native practitioners do not prescribe it alone; turmeric and "Toorunjbeen," (the Manna obtained from *Alhagi maurorum*) being added to the decoction of the powdered root and employed in cases requiring drastic purgatives, and where the oil of *Croton tiglium* could not be safely given. In medicinal activity

according to Schroff, *H. orientalis* is said to be the most potent of all the Hellebores. The analysis of Black Hellebore, the root under notice, by MM. Feneule et Capron produced a volatile oil, a fatty matter, a resin, wax, volatile acid, a bitter principle, mucus, alumina, gallate of potash, acidulous gallate of lime, and a salt with an ammoniacal base. Bastick in 1852 obtained a peculiar non-volatile crystalline, called Helleborin, of a bitter taste, producing a tingling sensation on the tongue.—(*Royle, Pharm., Lindley, Loudon, Edin Disp.*)

Ranunculus sceleratus, *Linn.*; *Don. Prod.* 195. *Celery-leaved Crowfoot.*

Linn. Syst. *Polyandria Polygynia.*

An erect annual, 1–3 ft. high; with smooth, tripartite stalked leaves; segments obovate, cuneate, trifid, obtusely cut, cauline, sessile, tripartite; calyx smooth; sepals reflexed; fruit small in an oblong spike.

Sind, Punjab Himalaya to 5,000 feet.

A virulent poisonous plant, producing violent effects if taken internally. The bruised leaves applied to the skin act very efficaciously as a vesicant. Used by beggars to keep open sores once caused by vesication or other means.

Delphinium saniculæfolium, *Boiss. Fl. Orient. i.* 91; *H. F. and T. Fl. Ind.* 49.

Vernacular—The flowers, Gafiz, Asburg, *Sind, Punj.*

Stem 1–2 ft. high; branches rigid, hoary with pubescence; leaves 1½–3 in dia., firm, lateral segments deeply cut, 2-lobed; lobes cuneate; racemes long, many flowered; flowers ½ in., pale blue; follicles 3, glabrous or pubescent.

Sind along the Indus, Punjab, and Southern Afghanistan at Chaman.

The flowers of this species are imported from Afghanistan into the Punjab in great quantities under the first vernacular name. They are used in Mooltan and other places with "ukilbeer" (datisea) and alum to dye silk yellow. Mr. Edgeworth according to Dr Stewart brought this drug to notice many years ago, and supposed it to be the flowers of *D. altissima* (*Wall.*), which are administered in infusion as a febrifuge.—(*Loudon, Lindley, Royle, Roxb., Dr. Stewart.*)

Coptis teeta, *Wall. Med. Phys. Trans. Calc. viii.* 347; *H. F. and T. Fl. Ind. i.* 42.

Linn. Syst. *Polyandria Monogynia.*

The root—Mishmee-teeta, *Assam*; Mahmira, *Sind.*

A small herbaceous plant found on the Mishmee mountains, first described by Wallich. It is known in Assam by the name of "The Golden Thread Root," and is held in high esteem by the inhabitants. In Sind it is used, as in Assam and other countries, for restoring the appetite, being given in infusion, also as an application in inflammation of the eyes. In debility, convalescence after fevers, and dyspepsia it has produced excellent effects. It has by some been used instead of quinine. It is imported into Bengal from Assam in small cane wickerwork baskets, containing 2 to 4 ozs., and consists of pieces the thickness of a quill, an inch or two in length, nearly cylindrical, contorted and of a yellow to brown colour. The root of *Thalictrum foliolosum* is often used as a substitute.—(*Lindley, Pharm. of Ind., Birdwood, Dr. Stewart.*)

Nigella sativa, *W.* *Small Fennel Flower.*

Linn. Syst. *Polyandria Pentagynia.*

The seed.

Vernacular—Kalajeera, Moogrela, *Beng.*; *Hind.*; Siah-dana, *Pers.*; Shoonez, *Arab.*; Hub-Sindee, *Egypt.*

A native of Egypt, Barbary, Caucasus, and the south of Europe, now extensively cultivated in India for its seeds, which is the *black cummin* of Scripture and *Melanthion* of Dioscorides. In the Bengal and Bombay presidencies they are given to nurses to promote the secretion of milk. In the Punjab the plant has been grown by Dr. Brown from imported seeds. There they are reckoned stimulant, and are administered by hakeems in milk for rheumatism and cough. It is said they were formerly used in place of pepper. Put among woollens, furs, &c. they prevent the attack of insects. The oil expressed from the seeds is colorless, rather viscid, and employed for the same purposes as the seed.—(*Birdwood, Dr. Stewart, Lindley.*)

Aconitum napellus, *W.* *Wolfsbane.*

Linn. Syst. *Polyandria Trigynia.*

The root.

Vernacular—Bish, Bikh, Buchnak, *Hind.*, *Beng.*, *Sind*; Doodhia, *Punj.*; Mohri, *Punjab.*

Indigenous in the Himalayas 10,000 to 16,000 ft., Sirmoor, Kamaon, and Nepaul. In their *Flora Indica* vol. I, Hooker and Thomson say :—"This is at once the most widely diffused and the most variable of aconites, being extremely abundant in temperate Europe, Asia, and America, in mountain pastures, and ascending into the Alpine regions. In America and Asia it is found abundantly, even on the borders of the Arctic Zone. The many apparently distinct forms when traced by the assistance of numerous suites of specimens are found to present no well defined characters of their own." The word *Bikh* is indifferently applied to the dried roots of all species of *Wolfsbane.* Dr. Buchanan, in his *Account of the Kingdom of Nepaul,* enumerates four kinds of Bikh :—1st, *Singya Bikh,* which he refers to a *Smilax*; 2nd, *Bikh*; 3rd, *Nirbisi,* which Royle refers to *A. ferox*; and the 4th, *Bikhma,* which is referred to *Aconitum palmatum.* Bikh is first mentioned, according to Sprengel, by Nicander. Linnæus says the root of this plant (*A. napellus*) is fatal to kine and goats, especially when they come fresh to it, and are not acquainted with it; but that it does not injure horses, who eat it only when dry. He also states that by simply inhaling the effluvia of the herb in full flower, persons have been seized with swooning fits, and have lost their sight for two or three days. All the species are poisonous, but according to Col. Munro, the roots of the Alpine forms of this plant are eaten by the hillmen of Kanawur as a pleasant tonic under the name of *Atees.* Moorcroft states that the stupefiant effects of honey in certain localities in Kamaon during spring is attributed to the bees feeding on an aconite. In the fresh state aconite root has a sharp odour of radish, which disappears on drying. Its taste is at first sweetish, but soon becomes acrid, accompanied with a tingling sensation and numbness. European aconite root, derived from the species under notice, affords aconitine in two forms—crystalline and amorphous, which will not dissolve in boiling water, but readily in weak aqueous ammonia. The properties of the root are powerfully sedative, anodyne, and anti-phlogistic; in large doses a virulent poison. It is a remedy of established value in various forms of neuralgia, tetanus, acute and chronic rheumatism, gout, erysipelas and in affections of the heart characterised by increased action, but its operation on the system requires to be carefully watched.—(*Pharm. of Ind., Hook. and Thomson, Pharm., Lindley, Loudon, Birdwood, Dr. Stewart, Royle.*)

Delphinium denudatum. *Wall.* *D. pauciflorum, Don.*

Linn. Syst. *Polyandria Trigynia.*

Vernacular—Judwar, *Hind.*, *Sind, Punj.*

A common plant in the outer mountains of the Western Himalayas, varying much in size, but in general recognisable by its few-flowered much-branched stems. The root is stated by Madden to be chewed by the Bussahirs as a remedy for tooth-ache.

Pæonia officinalis, *Linn.* *Common Pæony.*

Linn. Syst. *Polyandria Digynia.*

The flowers and roots.

Vernacular—Mamekh, *Punj.*

This plant occurs frequently in the Western Himalaya, generally at about 7,500 to 8,000 feet, and was by old authors said to be of two kinds, male and female, the flowers of the former being smaller and lighter colored than those of the latter. These distinctions were not indicative of sexual difference (the Pæony being hermaphrodite), but merely of stronger and weaker growing varieties. In the present day, according to Dr. Bellew, the root is in Boner, &c. given to cattle to render them prolific, and in combination with other drugs, as the bruised leaves of Melia, is a favorite remedy for bruises, sprains, &c. It has also the credit of being antispasmodic. Madden mentions that the young shoots are eaten as a vegetable, and suggests that the long root may furnish one of the kinds of *Bikh* (generally called Aconite q. v). An infusion of the dried flowers is in much favor in diarrhœa. The seeds are emetic and cathartic.—(*Loudon, Lindley, Dr. Stewart.*)

N. O. 156. PAPAVERACEÆ,—*POPPYWORTS.* Lind.—Bal. 13.

Papaver somniferum, *W.* *Garden Poppy.*

Linn. Syst. *Polyandria Monogynia.*

The capsules, seed, and juice of the capsule (opium).

Vernacular—The dry capsule or poppy head—Post, Kuskus-ke-fool. The seed—Kuskus. The juice—Afeem.

Native of the south of Europe and Asia Minor; was early cultivated, as it still is, in Egypt, also throughout India, Persia and China. Loudon states that "although it is found growing wild in the southern parts of Europe and even in England, yet there is every reason for thinking that its seeds must have been carried to these parts from Asia. It was early cultivated in Greece, perhaps at first solely for the sake of its seed, which was used as food. It is extensively cultivated in most of the States of Europe in the present day, not only on account of the opium, for which it is reared in Turkey, Persia and India, but also on account of the capsules and the bland oil obtained from the seeds." Independently of the garden forms, there are, according to Boissier (*Flora orientalis*) three principal varieties—*P. somniferum* occurring in the Peloponnesus, Corsica, and Cyprus; *P. glabrum* and *album* and *P. officinale* (Gmelin) which is cultivated in Persia, and has the capsule more or less egg-shaped and devoid of apertures.

The milky juice of the poppy, in its more perfect state, is extracted by incisions in the capsules and inspissated; and in this state forms "opium," an important article of commerce, the medicinal properties of which have been known from the remotest periods. To Theophrastus it was known under the name of MEKONION. It is repeatedly mentioned by Celsus in the 1st century as *Lacrima papaveris.* To China it is supposed to have been taken by the Arabians in the 9th century, but it does not seem to have been much employed until the time of the Arabs, except in the form of the confections called *Mithridatica, Theriaca,* and *Philonium.* According to Dioscorides and Pliny opium was formerly obtained from the black poppy, which is said to be very active; but the same qualities are found in the garden opium. That from Smyrna is reputed to be good, but Indian opium is decidedly superior to any other; much care being bestowed on its cultivation and preparation. Good opium when it has been some time made is dark brown or blackish externally, and reddish brown internally. Sp. Gr. about 3·36. The taste is strongly and permanently bitter, with some degree of acridity. The odour is both powerful and peculiar.

The principal places where this drug is produced in India are the central tract of the Ganges, table lands of Malwa, and the slopes of the Vindhya Hills: in the Punjab to a small extent in rich irrigated soil, and in Sind. That of Hydrabad, according to Fluck and Hanb., yielded 3½ per cent of morphine and 5¼ of narcotine; that of Malwa differs from that of Bengal in quality, the former yielding 6 per cent of morphia and

the latter 6½; but some specimens from Bareilly yielded not less than 8½ per cent. The medicinal uses are numerous and important. It is justly said to be the means of producing much happiness judiciously employed, and the utmost misery when abused. The primary effect, according to the *Pharm. of India*, is in medicinal doses stimulant; secondary—narcotic, anodyne, and antispasmodic. It operates chiefly on the cerebro-spinal system, and affects more or less every organ of the body; diminishes every secretion but that of the skin, which increases under its use. In fevers, especially in the advanced stages, it is of the highest value, either alone or in combination with other medicines; in spasmodic affections and in morbid states of the abdominal viscera it is given with the best results. Externally in the form of liniments, &c. it is found serviceable in rheumatism, neuralgia, hæmorrhoids, ophthalmia, &c. It is also largely used for smoking by the Chinese, and in India, where it is also eaten. The seeds (*kuskus*) are not considered narcotic, and are used in the manufacture of sweets, &c. also for seasoning food, and is believed to be nutritious. It yields on expression about 40 per cent of a clear limpid oil, used by natives throughout India for cooking and burning in lamps. Poppy oil is an article much in use by painters. It is sometimes prescribed by natives in diarrhœa with a very weak decoction of the dry capsules.—(*Roxb., Fl. Ind., Royle, Pharm., Pharm. of Ind., Lindley, Brandis, Dict., Lennep's Travels in Asia Minor, O'Shaughnessy, Birdwood, Ainslie.*)

Argemone mexicana, *W. Mexican Argemone, Gamboge Thistle or Jamaica Yellow Thistle.*

Linn. Syst: *Polyandria Monogynia.*

The seeds.

Vernacular—Brahmadundie, *Sans.*; Faringee-datura, Bhairbund, *Hind.*; Shial-kanta, *Beng.*; Cardo Santo, *Sp.*

An annual, 2–3 ft. high; stems armed with prickles; leaves alternate, sessile, jagged, spiny, soft, shining; flowers yellow, solitary, on erect peduncles; petals 6; calyx 3-leaved, prickly; capsules 6-valved, prickly; seeds numerous, round, black, with a slightly compressed scar on one side.

A native of Jamaica, the Carribee Islands, and Mexico, from which last country the Spaniards brought it to Europe under the name of *Fico del inferno*. It was introduced into India about 3 centuries ago, and is now found all over in abundant luxuriance. In Sind it is found among field crops, and about a mile inward along the Indus; and in some places, as Kotree, may be seen to cover large tracts. In the Punjab it has been introduced within the historical period, and is slowly working up. It has not been noted as occurring much to the west of Lahore. In 1854 Edgeworth observes that it had not reached Mooltan; but in 1866 it was seen in the extreme south-west of that district, near the junction of Trimab (Chenab) with the Gharra (Sutledge). It is abundant near Delhi, where an oil is extracted from the seeds, and as in Sind applied to indolent ulcers and eruptions, also as an external application for headaches. As an aperient it has long been in use among the West Indian native practitioners, and as such it has been favorably reported on, especially in colic by Drs. Selon, Whitshaw, Jamieson, Cantor, Condout, and Ellis. The smallness of the dose and the mildness of its operation are recommendations to its employment; half a drachm doses being sufficient to produce the necessary effects. It is also used in some parts of India for burning in lamps instead of mustard oil. The seeds are said to be a much stronger narcotic than opium, especially if smoked with tobacco. They are said to be used in the West Indies as a substitute for ipecacuanha. The whole plant abounds with a milky glutinous juice, which turns in the air to a fine bright yellow, not distinguishable from gamboge. In very small doses it is probably of equal efficacy in dropsies, jaundice, and cutaneous eruptions. In the last it has been used by Drs. Dymock and Bonavia with very good results. It is esteemed very detersive and generally used in ophthalmia, but, according to late investigations, it is said to be a dangerous remedy. An infusion is considered sudorific and resolutive, and may be successfully used on many occasions.—(*Lindley, Graham, Pharm. of Ind., Birdwood, Roxb., Ainslie, Dr. Stewart, Madras Ex. Rep., Hook. and Thomson, Fl. Ind.*)

ALLIANCE 33. *BERBERALES.*

N. O. 158. FUMARIACEÆ,—*FUMEWORTS.* Lind.—Bal. 14.

Fumaria parviflora, *Linn.* *Small-flowered Fumitory.*

Linn. Syst. *Diadelphia Hexandria.*

The herb.

Vernacular—Bun-sulpha, *Beng.*; Pitpapra, *Hind., Dec.*; Buklut-ul-Mulik, *Arab.*; Shatra, *Pers., Sind.*

A native of Bengal, the Himalayas, Neilgherry, Nepaul, and Bombay Presidency. In the Punjab it is abundant in fields, &c., in early spring, and occurs up to 3,500 feet, Trans-Indus, &c. In Bengal it appears common on cultivated lands. It has the habit of the European species *F. officinalis.* Hooker and Thomson in their *Flora Indica* remark that they "agree with Bentham in considering that most of the numerous European forms of Fumaria, including the species under notice, may be reduced to one variable plant—*F. officinalis,* Linn.—which, with larger or smaller flowers, variously cut leaves, erect or decumbent habit, &c., frequents waste places throughout Europe and a great part of temperate Asia." The only Indian *state* of the plant abounds in waste places, cornfields, &c., and differs in no respect from the form that bears the same name in Europe. Both *F. officinalis* and *F parviflora* have the same Indian synonymes. This species is said to be the KAPNOS of the Greeks. The ancients prized it much, especially Galen. Dr. Cullen says that fumitory is tonic, and Dr. Thornton is of opinion that it is extremly useful in leprous affections. The seeds and leaves are considered diuretic, diaphoretic and laxative in the Punjab, and enter into the composition of many sherbets. In conjunction with pepper, fumitory is reckoned an efficacious remedy in agues.—(*Roxb., Ainslie, Dr. Stewart, Hook. and Thomson, Loudon, Lindley, Birdwood.*)

Hypecoum procumbens, *Linn.*; *H. F. and T. Flora, Ind.* 275; *Hk. Fl. Br. Ind. i.* 120. *Procumbent Hypecoum or Gerard's Wild Cummin.*

A procumbent annual; leaves 2–3 pinnatisect; segments linear or oblong, cut; flowers few, yellow; outer petals 3-lobed; inner petals obtuse, midlobe 2-fid, fimbriate.

Sind, Beloochistan, Afghanistan, and Punjab Salt Range.—The juice of the plant is said to have the same effects as opium, and the leaves to act as a diaphoretic.

N. O. 159. BERBERIDACEÆ,—*BERBERIDS.* Lind.—Bal. 8.

Berberis lycium, *Royle.* *Ophthalmic Berbery.*

Linn. Syst. *Hexandria Monogynia.*

The extract.

Vernacular—Unjebar, *Pers.*; Kushmul, *Hind., Sind.* The extract—Rusot, *Hind.*; Ruswul, *Sind.*

A rigid, erect, spinous shrub, found in the N. W. Himalaya 3,000 to 9,000 feet from Hazara to Ghurwal, but not west of the former. Occurs also in Afghanistan. The drug prepared from the plant is of great antiquity. The ancients regarded it, as in the present day, as a remedy for ophthalmia. It was known by the name of *Lycium* to Dioscorides; and that it is the Lycium mentioned by him, has been definitely settled by Dr. Royle. It is mentioned by Celsus, Pliny, and Galen; and by later Greek writers and Arabian physicians. The latter in a work entitled *Ulfaz Udiweyeh* call it *utrar* and *unjebar-roomee.* The medical practitioners of ancient Greece and Italy are said to have made use of a substance called Lycium, the best kind being brought from India, held in high esteem for restraining inflammatory and other discharges; especially ophthalmic inflam-

mations. Lycium is enumerated as one of the exports of Barbarike at the mouth of the Indus, and among the commodities brought to Barrygoza. The extract (Rusote) is obtained by digesting in water slices of the bark, root and twigs for some time, then boiling, straining and evaporating it to a consistence. The bark of the root boiled is used as a dye in Poland, and is best made in lye. In the form of tincture it has been found extremely useful in India, in the treatment of fevers of all types, and in diarrhœa and dyspepsia; and as a tonic for general debility. Dr. Stewart says he is assured on the best authority that it is an excellent remedy for sun-blindness. The fruit makes an agreeable jelly, and as a medicine is considered a grateful and astringent acid. An electuary of the fruit is also said by Bellew to be given to children as a cooling laxative.—(*Pharm. of Ind., Royle, Roxb., Fl. Ind., Birdwood, Paxton's Bot. Dic., Punj. Reports.*)

Berberis aristata. *DC.* *Nepaul Berberry.*

Linn. Syst. *Hexandria Monogynia.*

The extract.

Vernacular—Rusot, Hooshish, *Hind.*; Chitra, Komloo, Tootrum, *Punj.*; Zirishk, *Pers.* The wood—Dar-huld, Darchobe, *Pers.* The extract—Rusote.

An erect spinous shrub found in the outer Himalaya from 6,000 to 9,000 feet, from the Sutlej to Bhootan, Neilgherry, and the Palney hills from 6,000 to 7,000 feet, and on the mountains of South India and Ceylon. Owing to the several forms of this plant it has received numerous specific names, as *Floribunda, Chitra, Ceratophylla, Umbellata*, &c. It is regarded as only less variable than *B. vulgaris*, from which it is distinguished by its much more coriaceous leaves, largely fascicled flowers of the raceme, greater length of the style, and small stigma. The *B. tinctoria* of Ceylon has no specific character to distinguish it from this. Solly (*Journal of Royal Asiatic Society*, 74) in stating that the same yellow coloring matter as the Berberry of Europe was produced by that of the Ceylon species, gives its specific name as *Aristata*. From many of the species *Berberine* is extracted, and from the root-bark an alkaloid (*Oxyacanthine*) was found by Polex in 1836. The root, fruit, and bark, and the extract prepared from the plant are used for similar purposes as the last.—(*Roxb., Fl. Ind., Hook. and Thomson, Fl. Ind., Pharm , Dr. Stewart, Cleghorn Punj. Rept.*)

N. O. 160. VITACEÆ,—*VINEWORTS.* Lind.—Bal. 53.

Vitis vinifera, *W.* *Common Grape.*

Linn. Syst. *Pentandria Monogynia.*

The dried fruit.

Vernacular—The dried fruit—Kishmish, *Hind.*; Drakh, *Hind.*; Angoor, *Pers.*; Zeebeb, *Arab.*

A large climber; tendrils bifid; leaves glabrous above; tomentum on underside grey, floccose.

Cultivated for its fruit all over Sind and the neighbouring countries.

Indigenous to Armenia, the Caucasus and other parts of Western Asia. In the North-West Himalaya it is found wild and is also cultivated to a large extent. In Kashmere, the Deccan about Poona, Ahmednuggur and Aurungabad, and in Afghanistan also excellent grapes are grown. In many parts of the Punjab also, and in Hazara and the Salt Range it appears to be indigenous. It is also found 6,500 feet or more on the Upper Chenab, to 6,000 feet on the Sutlej, and 6,000 to 9,000 feet and more in Tibet. In Sind it is grown in Hydrabad, Sehwan, and Shikarpoor, but the crop is very precarious

Raisins and currants are the really important products of the grape, and form a considerable export; they are largely consumed throughout Europe and Asia, and are produced from several species of Vitis in Europe, Turkey and Afghanistan. Humboldt defines the area of the profitable culture of the vine as a zone lying between 36° and

40° of north latitude. In pharmacy raisins are generally employed as a demulcent and a flavoring agent. The Persians consider them emolient and suppurative. The leaves on account of their astringency are sometimes used in diarrhœa. Grapes grown in the Deccan are of two kinds, which Dr. Gibson mentions are susceptible of blight from fogs and heavy atmosphere.—(*Brandis, Forest Flora, Dr. Stewart, Birdwood, Cleghorn Punj. Rep., Pharm., Graham Cat., Lindley, Southgate's Travels in Persia.*)

ALLIANCE 35. *RUTALES.*

N. O. 170. AURANTIACEÆ,—*CITRONWORTS.* Lind.—Bal. 40.

Feronia elephantinum. *Corr. Indian Wood or Elephant Apple.*

Linn. Syst. *Polygamia Monœcia.*

The fruit.

Vernacular—Kawit, Kuthbel, *Hind.*; Katoree, *Sind.*

This is a large handsome tree from 30 to 40 feet high, armed with stiff axillary spines; branches few, irregular; leaves pinnate; leaflets opposite, obovate, petioled; petioles winged; flowers hermaphrodite, tinged with red; calyx 5-toothed; petals 5, oblong; fruit large, the size of an apple, with a hard, grey rind; seeds numerous.

Found wild in South India, in the outer Himalayas and Siwalick tract, ascending to 1,500 feet, and extending west as far as the Ravi; in the Deccan and Concan also. Cultivated throughout India, but not in the plains of the Punjab. In Sind in gardens. The pulp of the fruit (wood apple) is eaten when ripe, unripe it is used as a condiment and to flavor curries; in the Deccan it is ground with chillies and garlic and eaten by the laboring classes with bajree (*Pencillaria spicata*) cake. The fruit, placed whole in hot ashes, until the rind burgts, is esteemed by them as a remedy to rouse a lethargic habit. Mr. J. Wood describes it in decoction as a powerful astringent. The ripe fruit is antiscorbutic. In its action it appears to assimilate very closely to Bael, but being more terebinthinate is less agreeable to the palate. The young leaves when bruised have a smell much resembling anise, and are used by native practitioners as a stomachic and carminative; in bowel complaints and indigestion of children it is held in high repute. The gum which exudes from the bark is very much like gum arabic. It occurs in the form of irregular semi-transparent reddish-brown tears. Treated with water it affords a brownish tasteless mucilage not less adhesive than gum arabic, and may be substituted for it. It has been used by painters for mixing with colors.—(*Brandis, For. Flo., Roxb., Fl. Ind., Lindley, Pharm. of Ind.*)

Ægle marmelos, *Corr. Bengal Quince.*

Linn. Syst. *Polyandria Monogynia.*

The fruit.

Vernacular—Bael, Shreephula, *Hind., Sans.*; Bel, *Dec.*; Bilwa, *Tam.*; Bel, *Punj.*; Katoree, *Sind.*

Grows to a pretty large tree. Is a native of the mountainous parts of the coast of Coromandel. Found also in low lands. In the Siwalick tract and the outer Himalayas, ascending to 4,000 ft.; also in Oudh, Behar, Bengal, Central and South India and Burmah. It is the *Bilwa* or *Matura* of the *Asiat. Researches* vol. II, p. 349; and Bilanus of Rumph. Under the first name (Bilwa) it is constantly alluded to as an emblem of increase and fertility in ancient Sanscrit poems, some parts of which are supposed to have been written as early as 1,000 B.C. It was noticed by Garcinia D'Orta, a Portuguese physician in the 16th century, and a century later by Bontius as *Malum cydonum*; subsequently also by Rheede and Rumphius; the latter mentioning its habitat as Guzerat, eastern parts of Java, Sumbava, and Celebes.

The fruit is called Shreepula (Hind.). The value of Bael in intestinal affections, though noticed by Rheede (*Hort. Mal.* vol. VIII, p. 371), Burman (*Flor. Ind.*, 1768) and other old writers, attracted little notice till 1853 when Sir Ronald Martin (*Lancet*, 1853, vol. II, p. 53) called the attention of the profession to it. Drs. Short and Newton, as the result of their respective personal experience, report very favorably on its action in dysentery. According to Dr. J. A Grew, a sherbet of the ripe fruit, taken every morning, proves serviceable in the dyspepsia of Europeans, when accompanied by obstinate constipation and flatulence. He adds that the unripe fruit baked for 6 hours is a powerful astringent; and as such is used by the natives for dysentery. This is corroborated by Horsefield in his account of the medicinal plants of Java, also by an article in the *Asiatic Researches* referred to above, in which last he adds that its fruit is nutritious, warm, and cathartic, in taste delicious, in fragrance exquisite. Almost every part of the tree is used medicinally by native practitioners. In fever cases a decoction of the root and also of the stem is employed; and, according to Rheede, a decoction of the root bark is considered on the Malabar coast as a sovereign remedy in hypochondriasis, melancholia, and palpitation of the heart. That of the leaves is valued in asthmatic complaints. A water distilled from the flowers is said to be alexipharmic. The mucus of the seeds is for some purposes a good cement. In Ceylon a perfume is prepared from the rind, and a dye is also extracted from it. In Peshawur large numbers of snuff-boxes for Afghans are made from the shell of the fruit, which is prettily carved over, and fitted with a small bone plug to the opening at the end.—(*Roxb., Asiat. Res.* vol. II, p. 349, *Pharm., Pharm. of Ind., Brandis, For. Fl., Markham's Travels in Peru and India., Dr. Stewart, Lindley, Ainslie, Graham, Royle.*)

Citrus limonum, *Risso.* *Common Sour Lime.*

Linn. Syst. *Polyadelphia Polyandria.*

The fruit (both fresh and dried).

Vernacular—Nimboo, Kutta Nimboo.

A native of India, cultivated in gardens; wild in Burmah and Chittagong, and common in the Doons between Sardah and Junna. Lemons and limes were unknown to the ancients and also to the Arabs, though noticed in Persian works on materia medica by the names of *leemoo* and *neemboo*. The juice of the lemon is used to flavor medicines, and as an excellent antiscorbutic and refrigerant. In scurvy it is one of the best remedies both as a prophylactic and as a curative. In acute rheumatism and some forms of dysentery it has been successfully employed.—(*Pharm., Pharm. of Ind., Royle, Birdwood.*)

Cultivated in gardens at Hydrabad and Jacobabad.

N. O. 171. AMYRIDACEÆ,—*AMYRIDS.* Lind.—Bal. 72.

Boswellia papyrifera, *Hoch.*

Linn. Syst. *Decandria Monogynia.*

The gum resin—frankincense; olibanum.

Vernacular—Loban, Esus, *Hind.*; Ood, *Dec.*; Ganda-biroza, *Pers.*, *Sind.*

The source of the incense or frankincense of Scripture has been the subject of recent and more exact observation. Dr. Birdwood has written exhaustively on the subject, and so have Dr. Royle and others; but notwithstanding their laborious researches the true source is yet doubtful. Endlicher referred it to *Plosslea floribunda*, and Hochsetter to *Boswellia papyrifera*, now known to be one with Endlicher's plant. Carter, who visited the Libanophorus region of the old Sabeans in 1844, south-west of Arabia, also determined the plant to be Hochsetter's plant. Dr. Birdwood, from the cuttings received from Abyssinia and Arabia, states that *one* was undoubtedly from the *B. papyrifera*, which is said to be one of the most remarkable trees in Abyssinia, where it is called *Makker*. It yields a fragrant transparent lemon-colored resin which is used as incense, but it is chiefly remarkable for the bark peeling off into thin white layers, which were actually employed by Quartin, Dilton and Schimper for packing their dried plants in. The same peculiarity in the bark of *Balsamodendron pubescens*

has been observed by Dr. Stocks, which he says separates in large rolls much resembling those of Betula Bhojputra. Lieut. Kempthorn, of the Indian Navy, describes the bark of the tree growing in the Soumalie coast as consisting of four layers; the two middle being of fine texture, transparent like oiled-paper, and employed by the Soumalis for writing on. This bark Mr. Bennet of the British Museum recognised as very similar to that of a tree of which specimens were collected by Schimper, and named by Endlicher *Plosslea floribunda*. Olibanum is a terebinthinate stimulant, and is used internally in bronchitis, and as a local application in ulcerations, &c.—(*Birdwood, Lindley, Pharm., Pharm. of India.*)

Balsamodendron mukkul, *Hook.*; *Stocks, in Hook. Journ. Bot.* 1849; *Brandis For. Fl.* 64; *B. Roxburghii*; *Dalz. and Gibs. Bom. Fl. Supp.* 19. (*not of Arn.*).

Linn. Syst. *Octandria Monogynia.*

The gum resin—Bdellium.

Vernacular—Googul, Mukkul, *Hind., Sind.*

A small tree, 4 to 6 feet high. Branches frequently spiniform; leaves 1–3 foliolate, generally approximate at the end of thick, short, tuberculate or woody branchlets. On luxuriant shoots, the leaves are alternate, cuneate-obovate, rhomboid or oval, acute, deeply serrate, with a petiole, from the summit of which spring one or two lateral leaflets smaller than the terminal ones, sometimes minute; flowers small, subsessile, 2–3 together; flowers in March and April in Sind; drupe red when ripe, ovate, acuminate, separating into two fleshy valves, leaving the nut enveloped by a 4-cleft yellow pulp, the lobes of which meet at the apex; drupe rarely 4-valved, 4 nuts, and 8 cleft pulp.

Indigenous in Sind on rocky ground, Kattiawar, Deesa, Rajpootana, Kutch, Kandeish and Beloochistan, and probably in Arabia. The ash-colored bark of this plant comes off in rough flakes, exposing the under bark, which also peels off in thin rolls like paper. By incision a gum resin called googul (bdellium) is obtained, which in Sind is only collected in the cold season, each tree yielding from ¾ to 1 seer. The resin occurs in roundish pieces, soft and opaque, moister than myrrh, but not brittle, softening with the heat of the hand; bitter and slightly acrid with less agreeable odour. This exudation is exported in considerable quantities from Oomrawuttee. The *googul* of the Tellingoos is the produce of *Boswellia glabra* (W. and A.). Of the other kinds of modern bdellium, the African is obtained from *B. africanum*; Egyptian from *Hyphæne thebaica*; and Sicilian from *Daucus gummifera.*

In medicine bdellium (googul) is employed for the same purposes as myrrh, and is often substituted for it, being less expensive. Dr. Newton reports favorably of it in the form of ointment for cleansing and stimulating indolent and ill-conditioned ulcers.

In Delhi and Sind sores it is a favorite application, combined with sulphur, catechu, and borax.—(*Brandis For. Fl., Lindley, Drury, Roxb., Ainslie, Pharm. of Ind., Royle, Stocks.*)

Balsamodendron pubescens, (*Stocks*) *Bom. Trans.* 1847; *Brandis, For. Fl.*, 64; *Hk. Fl. Br. Ind. i.* 529.

Linn. Syst. *Octandria Monogynia.*

The gum resin.

Vernacular—Googul, *Sind, Hind.*; Bayee, Bel.

A small tree or stunted shrub, unarmed, pubescent; leaves trifoliolate on slender petioles, longer than leaflets; terminal leaflet

stalked, generally fascicled on short tuberculate branchlets, but alternate on vigorous shoots; leaflets ovate or obovate, entire; petals red or white; drupe red, valves 2, each cleft half way up from below; mesocarp orange-colored, 4-toothed, not reaching to the apex of the drupe.

Indigenous in Sind, Arabia, and the Beloochistan hills. The exudation from this plant is also called *googul*. It has properties analogous to the last, and is used for the same purposes. The young shoots and buds when bruised yield a fragrant aroma.—(*Brandis For. Flo.*)

Balsamodendron myrrha, *Nees ab Esen.*

Linn. Syst. *Octandria Monogynia.*

The gum resin—Myrrh.

Vernacular—Heerabolo, *Hind.*

This tree is said to be found in Arabia and the Troglodyte Country. It was met with in Abyssinia, on the hills which extend to the Red Sea, near the Straits of Babelmandeb. Ehrenberg, who visited Egypt, Nubia, Abyssinia and Arabia, brought with him specimens found at Gison on the borders of Arabia Felix, on the mountains bordering Djara or Shahra. The myrrh trees there formed the underwood of the forests of Acacia, Moringa, and Euphorbia, and Nees Von Esenbeck called them *Balsamodendron myrrha.* Arrian mentions that Alexander's army found vast numbers of myrrh trees growing in the territory of the Gadrossi (the present Mekran), that the exudation was gathered by the physicians; and that it was one of the 16 ingredients which composed the famous "Zulphi," which is said to have been inflamed every night to the setting sun in the temple of Vulcan at Memphis. The source of myrrh is yet uncertain, though it is probable it belongs to the genus Balsamodendron.

From the earliest times myrrh has been used as an incense in temples, and as an ointment. It occurs in irregular roundish masses varying much in size, somewhat translucent, of a reddish yellow exhibiting a rough or waxy fracture when broken—has a peculiar, agreeable and aromatic fragrance with an aromatic bitter and acrid taste—is partially soluble in water, alcohol or ether. By the natives of India it is prescribed in cases requiring gentle cordials, and externally with lime juice as a repellent in tumours and bruises. In the *Pharm. of India* its properties are given as stimulant, expectorant and emmenagogue; and as a remedy of value in uterine and pulmonary affections, and disordered state of the digestive organs. As a local or external agent it is much used in affections of the mouth and fauces, and indolent ulceration. In bronchitis of long standing Dr. William states (*Cyc. of Pract. Med.* vol. I, p. 322) that he has found it a very valuable medicine, particularly after a course of expectorants, when its grateful and tonic effects upon the stomach give it an additional recommendation. It is inadmissible when fever or irritability is present.—(*Birdwood, Pharm., Pharm. of Ind., Royle, Waring's Therapeutics, Ainslie.*)

Balsamodendron gileadense, *Kunth.*; *Oliv. Fl. Trop. Af. i.* 326.

Linn. Syst. *Octandria Monogynia.*

The oleo resin—balm of Gilead—balsam of Mecca.

Vernacular—Oodi Belisan, *Hind.*

This tree is indigenous in Arabia. The oleo resin, which has borne the name of *Balsamum judaicum, B. syriacum, B. de mecca* and *opobalsamum,* is the "Balm" of Scripture,—the BALASAMON of Theophrastus and Dioscorides, and is sold under any of the above synonyms to the present day in India. Pliny, Diodorus, and ancient authors generally considered Judæa the native country solely of the balm trees, but it has now been ascertained that they are also found in Arabia, and Dr. Roth mentions it as occurring in the Adel country.

The true opobalsamum, according to Alpinus, is at first turbid and white, of a strong pungent smell, like that of turpentine, but much sweeter; and of a bitter acrid astringent taste, and is said to be obtained from the mature fruit. It changes if kept too long, and becomes thin and limpid, of a greenish hue; and at length the color of honey. In India, as in Egypt, it is held in high esteem, and is considered a panacea for bad wounds, ulcers, and poisonous bites, and in nervous and pulmonic affections. Used also as a cosmetic by Turkish ladies. In most parts of Arabia the wood is burnt as a perfume, in mosques, dwelling houses, &c. It is said that opobalsamum was one of the ingredients in the famous "mithridate" which was recommended by Celsus against poisons.

In Europe this substance is not procurable genuine, and in consequence its reputed virtues have been considered doubtful, and it has seldom been employed medicinally. —(*Birdwood, Royle, Ainslie, Edin. Disp.*)

N. O. 172. CEDRELACEÆ—*CEDRELADS.* Lind.—Bal. 52.

Soymida febrifuga, *A. Juss.*; *Bedd. Fl. Sylv. t.* 8.

Linn. Syst. *Monadelphia Decandria.*

The bark.

Vernacular—Rohun, Rohunna, *Hind., Dec.*

This is a lofty tree, a native of several of the mountainous districts of India. It is common in the Rajamundry Circars and Cuddapa districts; also in the Deccan and Coromandel. In Guzerat and in the Ajunta Jungle it grows in considerable abundance. It was first brought to notice by Dr. Roxburgh, who discovered that its bark (Rohun) was a perfect substitute for Cinchona; and after numerous trials, recommended its use in intermittent fevers. Trials were also made by several other medical officers, who attested its value as an antiperiodic, for which purpose it is now chiefly used. Ainslie states that in larger doses than four or five drachms it causes derangement of the nervous system, occasioning vertigo and subsequent stupor. Besides its use as a febrifuge it has also been successfully employed in bad cases of gangrene, chronic diarrhœa, and dysentery; and in leucorrhœa, atonic menorrhagia, in relaxation of the mucous membrane of the rectum, attended with prolapsus ani, it may be used as an injective decoction with advantage. By the natives it is much esteemed as an antiperiodic.

The bark as found in the bazaars occurs in compact thick pieces, fibrous, of a rusty colour, and brittle. An extract prepared from it and the sample sent home could not be distinguished from that of the shops. Various barks have at different times been recommended as substitutes for cinchona, but none have been found to equal it. The bark of a large and lofty tree of this order (*Chikrassia tabularis*) of Bengal is also a powerful astringent, but like that of the *Cedrela toona* lacks bitterness.—(*Ainslie, Roxb., Royle, Lind., Graham, Waring, Pharm. of India, Edin. Disp., Pharm., Markham's Travels in Peru.*)

Cedrela toona, *Roxb. Fl. Ind. i.* 635.

Linn. Syst. *Pentandria Monogynia.*

The flowers and bark.

Vernacular—Toon. The flowers—Gool-toon, *Sind, Punj.*

This fine timber tree is common in Bengal and occurs also in the Punjab. It is grown almost throughout that province and Cis-Indus. It is well known for the fine Mahogany-like timber which is obtained from it, and used chiefly in cabinet-making. The bark of the tree is a powerful astringent, and is used in both Sind and the Punjab with the powder of the seeds of *Guilandina bonduc* in the cure of remittent and intermittent fevers. The flowers are considered emmenagogue and abortive.—(*Stewart Punj. Plants.*)

N. O. 173. MELIACEÆ,—*MELIADS.* Lind.—Bal. 50.

Azedarachta indica, *A. de. Juss.* *Ash-leaved Bead Tree.*

Linn. Syst. *Monadelphia Decandria.*

The fruit.

Vernacular—Nim, Neem, *Hind.*; Neemori, *Sind*; Nim, *Punj.*

A common tree throughout the greater part of India, generally seen from 40 to 50 feet in height, with a straight trunk, attaining a girth of from 6 to 9 feet; leaves simply pinnate; leaflets 9–15, opposite or nearly so, shortly petiolate, 1–3 in. long, ovate-lanceolate, serrate, acuminate, glabrous; flowers white, honey-scented, pentamerous, on slender pedicels, in axillary panicles; drupe ovoid-oblong, ½–¾ in. long, dark purple when ripe; putamen cartilaginous, 1-celled, 1-seeded, reticulate outside.

Common in Ceylon and Burmah. In the Punjab it is commonly planted, but nowhere occurs really wild. West of the Sutlej it is comparatively rare. In Kumaon it ascends to 5,000 feet. In the Deccan, especially between Poona and Decksal, up to Hydrabad, and in South India in the Coimbatore districts, it is abundant. In the Prome districts of Pegu it is seen growing, but whether planted or indigenous is uncertain. In Sind it is plentifully planted along road sides, and from the shelter afforded by its luxuriant foliage is a most valuable neighbour to villages in Sind. Under the name of Nimba it is found mentioned in the Ayurvedas (*Systema Medicinæ*) of Susruta, one of the most ancient of the Hindu medical writings. Every part of this tree is reputed to possess medicinal properties. The bitter astringent bark is considered by native practitioners to be a most valuable tonic and febrifuge, and it has been successfully employed by English physicians in India as a substitute for cinchona. Its value in the treatment of periodical fevers is noticed by Fra Bartholomew, Sonnerat, and other old writers, but it was first prominently brought forward in 1803, by Dr. D. White (*Ainslie Mat. Med.*), who stated that he had witnessed success from its employment, fully equal to what might be expected from Cinchona. Its claims to the character of an antiperiodic have been carefully examined by Dr. W. R. Cornish and Dr. Wyndowe, and the result, based on the statistical data as expressed by the former, is to the effect that margosa bark is nearly as effective in the treatment of intermittents as the old established remedies, cinchona and arsenic. Dr. Foules (*Madras Med. Reports*, 1855) also arrived at a similar conclusion. The general tenor of the reports of the several medical officers tends to show that as an antiperiodic, chiefly in the milder forms of periodical fever, it is effectual; and that as a tonic in convalescence after febrile and inflammatory affections it is very valuable. According to the analysis of Dr. Cornish this bark contains a volatile oil, a bitter resin, gum, starch, saccharine matter, an astringent substance (catechin) and a bitter crystalizable principle named by him Margosine, but which he obtained only in a small quantity as Double Salt of Margosine and Soda; and which is probably identical with that previously obtained by Mr. Piddington (*Cal. Med. Phys. Trans.*), and named by him *Sulphate of Azederine.*

A bitter oil, fixed, acrid, of a deep yellow and strong disagreeable flavour, is extracted from the pericarp by boiling or pressure, which is used as an anthelmintic and stimulant, and is moreover a remedy in leprosy. It is also applied externally in bad ulcers; and used in the form of a liniment for headaches. The seeds are highly aromatic, and the fair sex in Sind apply them as a plaster on the temples, both for their fragrance, and also to drive vermin from their hair. It is considered poisonous in large doses.

The leaves are universally used as a poultice in sprains, swelled feet, ulcers, rheumatism, and leprosy; of which use Drs. Grant and Dunbar speak highly. Major Lowther in the *Agri-Horticultural Report* states a decoction was given with success to European soldiers in epidemic cholera at Berhampore. The sap, which at certain seasons of the year flows spontaneously from the trees, is supposed to be beneficial in all cases in which the bark is used, and I would here record from personal observations that, in 1865, from almost all trees on the road side on the route from Giddoo-ka Tanda to

Hydrabad, this sap flowed copiously, and was collected by numbers of mendicants and others afflicted with sores, and drunk as a remedy; the druggists themselves collecting sufficient to obtain a saccharine matter, which is left on evaporation, and is given in fevers. Major Lowther, writing from Jullundur to the Agri-Horticultural Society, mentions a similar fact, and states that "such was the repute in which this natural medicine was held, that natives came in crowds and carried away the liquor in their vessels." The gum of this tree is said by Honigberger to be officinal. It is also mentioned in Southern India as medicinal.—(*Dr Stewart, Graham, Lt. James' Report on Chandooka Pergunna in Upper Sind, Appendix to Markham's Travels in Peru and India, Brandis For. Flo., Pharm. Appendix Nos.* 24, 25, 26, *Pharm. of India.*)

Melia Azedarach, *Linn*; *Roxb. Fl. Ind. ii.* 395; *Boiss. Fl. Orient. i.* 954; *Brandis, For. Flo.* 68. *The Persian Lilac or Common Bead-tree.*

Linn. Syst. *Monadelphia Decandria.*

Vernacular—Bakayun, Drek, *Sind, Punj.*; Nim, *Hind.*

A moderate-sized tree 20 to 30 feet high, with a short erect trunk; leaves bipinnate, occasionally tripinnate, 9–18 in. long; pinnæ opposite or nearly so, with 3–7 leaflets, ½–3 by ⅙–1¼ in.; flowers generally pentamerous, lilac, ¼–⅓ in. long, honey-scented, on slender pedicels, in axillary panicles; drupe sub-globose, ½–¾ in. diam., yellow when ripe; putamen thick, hard, 5-celled, 5-seeded.

Found planted in Sind. In the Punjab it replaces *M. Azedarachta,* being abundant in the Centre and West of that province. Wild in the Sub-Himalayan tract, 2000–3000 ft. In Afghanistan, Western Asia, South Europe and Australia it is commonly cultivated. The wood of old trees is often handsomely marked, and is used for furniture in the Peninsula. The bark is extremely bitter, and the leaves are used as a poultice for sprains, &c. The pulp of the fruit is said to be poisonous in a high degree, and mixed with grease will kill dogs. The seeds are strung as beads for rosaries.—(*Brandis For. Flo., Loudon.*)

N. O. 174. ANACARDIACEÆ,—*ANACARDS.* Lind.—Bal. 71.

Pistacia vera, *Linn.* *Pistachio-nut Tree.*

Linn. Syst. *Diœcia Pentandria.*

The gall and leaf.

Vernacular—Gooli-i-pista. The leaf—Pista-ke-putta. The gall—Bozghanj.

This tree is indigenous in Persia, Syria, Bokhara, Mesopotamia, Turkestan, and North Afghanistan, and is cultivated in Sicily and other parts of Southern Europe. It is cultivated with great industry at Aleppo, and the nuts are reckoned superior to those produced in any other part of the world. The nuts contain a small oily seed which is imported in considerable quantities. It is eaten with relish by natives of Persia and Afghanistan, though probably indigestible. The tree also yields the gall of native druggists, called Gooli-i-pista or Bozghanj, which is used as an astringent, and a dye for silks. In an account of the silk manufactures in the Punjab, *Select Papers Agri-Horticultural Report,* it is said that from 1 to 4, commonly 2½ and 3 chitaks are used for every seer of silk dyed, according to the intensity of the color it is intended to impart, so that the actual cost of dyeing one seer of scarlet silk, including the eight annas charged by the dyer for his labor, and a proportion of 1 Rupee per seer, the cost of the Bozghanj which is brought from Cabul, and sold at the rate of 107 tolas to a seer, amounts from 1 Rupee 4 annas to 1 Rupee 8 annas, according to the quantity of cochineal used, which is sold at from Rs. 5-8 to Rs. 6 per seer.

Davies' trade report gives the quantity of the galls imported viâ Peshawur as 50 maunds and 100 maunds as brought down by the Bolan.—(*Brandis For. Flo., Dr. Stewart, Russel's Aleppo, Punjab Select Papers Agri-Horticultural Society.*)

Pistacia lentiscus, *W.* *Mastic Tree.*

Linn. Syst. *Diœcia Pentandria.*

The resin—Mastic or Mastiche.

Vernacular—Roomce Mustikee, *Hind.*; Kinniah, *Persian.*

Indigenous in the south of Europe, north of Africa, and the Mediterranean shores from Syria to Spain. Also found in Portugal, Morocco, and the Canaries. It produces the "mastich," which is obtained abundantly by making transverse incisions in the bark of the tree, whence it exudes in drops which harden partly on the stem and on the ground. The mastic which concretes on the stem is called "mastiche in tears," while that which falls on the ground is common mastic. It occurs in small spherical flattened or irregular pale yellow tears, which are externally farinaceous, owing to their mutual attrition. Fracture vitreous, odour mild and agreeable, and but little taste. The best kind consists of roundish pieces the size of small peas, with others oblong or pear-shaped, of a pale yellow tint, darkening by age, and slightly opaque on the surface, but perfectly transparent within. The Sp. gr. of selected tears of mastic is about 1·06. They soften at 99° C. but do not melt below 108°.

As a medicine, mastich is now rarely employed. Dentists employ mastich dissolved in alcohol, ether, or chloroform, for filling up the cavities of carious teeth. Turkish and Armenian women and Mahomedans of the higher class use it as a masticatory for cleansing the teeth, and for giving an agreeable odour to the breath. It is in very common use as a varnish in alcohol or turpentine.—(*Royle, Cleghorn, Punj. Rept, Loudon, Pharm. of Ind., Brandis For. Flo., Pharm., Ainslie, Dr. Stewart, Pereira, Lindley.*)

Pistacia cabulica, *Stocks*; *Boissier l. c.*

Vernacular—Kinjak, Kasur, *Sahti*; Kundroe, *Sind.*

A small tree found in Afghanistan, Beloochistan, and Upper Sind; yields a resin-like mastic in both Afghanistan and Beloochistan, which is employed as a succedaneum for mastich. By Persian writers it is designated Kundurin and Shakur Shirin (sweet mastich). *P. khinjuk* (Stocks), called Khinjuk Sharamna and Sheawanna in Afghanistan, is also found in Beloochistan and Upper Sind, and yields curiously-shaped galls called "gooli-pista." They are fig-shaped, spherical or ovoid excrescences, about half an inch in length, of a reddish brown color, and hollow, the walls being thin, fragile, and translucent. Taste acidulous, astringent, and slightly terebinthous. Dr. Stewart in his article on *P. terebinthin* (*P. khinjuk*, Stocks) quotes Bellew's statement that the tree Khinjuk (Afg.), Shnee (T. I.), is common over the hills of Eastern Afghanistan, and that he (Dr. Stewart) found, what appears to be this tree, in Waziristan on the eastern skirts of the Sulman range. According to Bellew, the fruit in Afghanistan is considered warm, stimulating, and stomachic; and is given in colic and dyspepsia, and the gum (mastich) (the aluk-ul-umbut of the native Pharmacopœia, and according to Stocks yielded in Sind also by this tree) is used as a masticatory, and forms an ingredient in various ointments.—(*Pharm. of Ind., Lindley, Brandis For. Flo., Cleghorn, Punj. Rep., Dr. Stewart, Pharm.*)

Rhus acuminata, *DC.*; *Rhus succedanea, Linn.* *Wild Varnish Tree.* (*Kœmp.*)

Linn. Syst. *Pentandria Trigynia.*

The galls.

Vernacular—Kakra-Singhee, *Hind.*; Tatree, Arkhol, Rikul, *Punj.*

A moderate-sized tree, 25 to 30 feet high, with a short trunk, found in many parts of the Himalayas from 2,000 to 8,000 feet, from the Jhelum to Assam; also in the Kasia hills, China and Japan. On the river bank below Raeenghur, in the valley of Pabur, Cleghorn states many trees were seen, and among the plants enumerated by him as observed from Miru ridge down to Kotgur, were this and *R. paviflora.* The species under notice is commonly known by the name of Kakrasinghee from the horn-like excrescences borne on its branches, caused by insects. These excrescences are

hollow, thin walled, generally cylindrical, tapering to either extremity, contorted and irregular. The milky juice of the tree (and Vigne states the fresh leaves also) possess caustic properties said to depend upon the presence of a volatile acrid principle, which seems to be a hydrocarbon, and as in the case of the cashew and marking nut, leaves an indellible stain on cotton, linen, and paper. Bears are said to eat the fruit, which is considered to be the officinal "Hubbul Zhuzra" of the Cashmerians, to which, astringent and tonic properties are assigned. The milky juice of many other species of Rhus also stains black and is sometimes as in *R. toxicodendron* and *radicans* extremely poisonous; being volatile it is capable of poisoning persons who approach or handle these plants; the gaseous exhalation alone is sufficient to cause distressing symptoms. (For an account of the poisonous effects of some of these plants see Lindley's *Vegetable Kingdom, Anacardiaceæ*, pages 467-468.) The same effects are produced by *R. venata. Rhus coriaria*, a native of Persia, Syria, Palestine and the south of Europe, is valued for the astringent properties of its leaves, which are used by tanners; the leaves of *R. cotinus* and *parviflora* are also used for a like purpose. The fruit of *R. coriaria* is eaten by the Turks, and used for sharpening their vinegar. The bark of *R. glabrum* is employed as a febrifuge and as a mordant for red colors.—(*Dr. Stewart, Brandis For. Flo., Cleghorn's Punj. Rep., Royle, Lindley, Loudon. Pharm. of Ind.*)

Mangifera indica, *W. The Mango Tree.*

Linn. Syst. *Polygamia Monœcia.*

The kernel.

Vernacular—Amb, *Hind.*; Amba, *Dec.*; Mawashi, *Punj.*

A large evergreen tree growing throughout all the warmer parts of Asia—indigenous in Burmah and Ceylon. It is believed to be wild in the Sub-Himalayan tract, in deep gorges of the Baraich and Gonda Hills, in Oudh, and on the outer hills in Kamaon and Gharwal. In the North-West Provinces it extends to Lahore, being most common towards the hills nearer the south, *e.g.* in Harriana; is abundant in the north of the Gardaspur district and the Kangra Valley, and common at Mooltan. To the south-west from the line of the Ravi it almost disappears except at one or two places in Moozuffurgur and about Sealkote. It grows to about 3,500 feet, but at such elevations is said to produce fruit only every second year.

The fruit (mango) is esteemed the most delicious in India, being as highly valued as the peach in temperate countries. From it, when unripe, pickles, jellies and conserves are made. The bark, especially of the root, is a bitter aromatic, and is used in diarrhœa, leucorrhœa, &c. The young leaves are pectoral, and the old ones are used for cleaning the teeth. The kernel is reputed anthelmintic, and Dr. Kirkpatrick mentions having used it as such, in doses of 20 to 30 grains, with effect. A gruel is made from the flour of the dried kernel, and is administered in cases of obstinate diarrhœa and bleeding piles. In the Punjab the kernels are eaten in times of famine. A resin obtained from the bark of the tree is considered anti-syphillitic.—(*Brand. For. Flo., Birdwood, Lindley, Dr. Stocks, Cleghorn Punjab Rep., Cat. of Mysore Drugs.*)

Semecarpus anacardium, *Linn. Marking Nut or Malacca Bean.*

Linn. Syst. *Polygamia Diœcia.*

The nut.

Vernacular—Beelowa, Belatak, *Hind.*, *Dec.*; Beladur, *Arab.*; Shayrung-cotay, *Tam.*

A common tree found on the coasts of Bombay, the Concans, Deccan and Madras, also in Bengal, Pegu, Berar, Assam, Kumaon and Sylhet, and in the outer Himalaya, ascending to 3,500 feet. It is commonly known as the *marking nut* tree, from the fact of the black viscid juice of the seed, contained in the cells between the laminæ of the shell of the fruit, being in common use as marking ink. This juice possesses powerful caustic properties. It is employed by the natives as a vesicant, and is considered by the Hindoos of Malabar a valuable medicine in scrofulous, venereal and leprous affections.

An oil is obtained from the nut by boiling, used externally in rheumatism and pains; it is of a very stimulating nature, so much so that undiluted it acts as a vesicant; and as such the juice also is used, being quicker in effect. The use of both oil and juice has been condemned, serious effects having followed, even when it has been applied to a very circumscribed surface (see *Bengal Disp.* p. 280 and Dr. Gibson's *Bombay Med. and Phys. Trans.*, vol. I, p. 232). Much caution is therefore requisite in handling the juice for domestic purposes, as erysipelatous inflammation has in some instances followed too free exposure to its irritating vapour. In the Punjab the fruit is used to prepare a wash for salivation, and its smoke is reckoned efficacious for impotency.

The green fruit pounded into a pulp makes good bird-lime. The fleshy receptacle, which is about the size of the nut, is roasted in ashes, and eaten by the natives, and Roxburgh (*Coromandel Plants* vol. I. p. 14) tells us that in taste it is exceedingly like that of apples similarly cooked. The pollen of the anthers of the flowers is also said to have irritating properties, but not to such an extent as the juice of the nut.—(*Dr. Stewart, Birdwood, Ainslie, Loudon, Lindley, Pharm of Ind., Roxb., Fl. Ind., Brandis For. Fl.*)

Buchanania latifolia, *Linn.*

Linn. Syst. *Decandria Pentagynia.*

The fruit.

Vernacular—Cheerownjee, *Hind.*; Pyal, Charoolee, *Bombay*; Piasal, *Guz., Punj., Dec.*; Chirowlee, *Punj., Sind.*

A moderate-sized handsome tree, with fragrant flowers, 40–50 feet high, with a straight trunk. Found in North and Central India, Malabar, Coromandel and Burmah, and to 3,000 ft. in the outer Himalayan ranges. In the Punjab Siwalick tract Dr. Stewart says it is doubtful if this tree grows in any numbers. In the Sal Forests it is common, but extends far beyond their limits in the South. In Canara and Sunda it is most frequent above the Ghauts; and in Mysore and Cuddapa is abundant. The fruit, which is about the size of a small cherry, hangs in bunches on the tree, has a pleasant sweetish subacid flavor, and is an important article of food to the Hill tribes (Gonds and Byghas) in the Central Provinces. They collect the kernels and extract the seeds, which they barter for grain. The kernel in taste is somewhat like the Pistachio nut, and forms an important article of trade, being used largely in native sweetmeats. Brahmins in the Western Presidency are very partial to them, and eat them roasted. The oil extracted from the kernel is of a straw color, limpid, and very like gingelly oil in taste, and is often substituted for it. In places where the tree is abundant the bark is used for tanning, the leaves serve as a substitute for plates at large dinners, and the gum which exudes from wounds in the stem is employed as a remedy in diarrhœa. —(*Brandis For. Flo., Dr. Stewart, Birdwood.*)

Anacardium occidentale, *Linn.* *Cashew Tree.*

Linn Syst. *Ennandria Monogynia.*

The nut or seed.

Vernacular—Kajoo, *Dec., Hind.*; Higlee Badam, *Beng.*; Bijara Sala, *Sans.*; Kolamana, *Tam.*

This is a small tree from 12 to 18 feet in height. Indigenous in South America, and now naturalized in the Bombay Presidency, Malabar, Coromandel, Ceylon, Burmah, and the West Indies. It bears panicled corymbs of sweet-smelling flowers, succeeded by edible fruit of a yellow and red color, rather acrid and astringent, from which a fiery spirit is distilled in Goa, the Concans, and Malabar, far superior to Arrack or Rum, making an admirable "Punch," and promoting urine. The nut attached to the lower end of the fruit is the size and shape of a hare's kidney—having two shells; the outer being of an ash color; and between this and the one immediately covering the kernel, is a thick caustic and inflammable fluid, which contains an acrid principle (cardole) and a peculiar acid (anacardic), which possesses powerful rubefacient and vesicant properties, and is much used by natives as a remedy for ringworms, corns and ulcers. It is said that smeared on wood it preserves it from decay. The kernels are sold in the

bazaars throughout India in the fresh state, roasted, and sugared over like comfits. It is often substituted for almonds by native confectioners, and in Sind it is chiefly used with the seeds of *Arachis hypogea* (ground nut) and *Pistachia vera* (Pistachio nut) in making the much-esteemed sweetmeat called "Hulwah." The milky juice which exudes from the bark of the tree by incision indelibly stains linen. The tree also transudes a quantity of fine transparent gum not unlike or inferior to gum Arabic, except in being a little astringent, which perhaps enhances its value.

N. O. 176. RUTACEÆ,—*RUEWORTS*. Lind—Bal. 63.

Ruta graveolens, *Var angustifolia, Pers. W.* *Garden Rue.*

Linn. Syst. *Decandria Monogynia.*

The herb and dried seed.

Vernacular—Pismarum, Sudab, Sataree, *Hind., Dec.*; Arooda, *Arab., Pers.*

A small branching under-shrub, 2–3 feet high, evergreen, with glaucous, pulpy, dotted, doubly pinnate leaves, having a repulsive odor and a bitter disagreeable taste, possessing considerable acrimony in the fresh state, but which is in a great measure dissipated on drying.

It is cultivated in most countries and in India in gardens for the medicinal properties of its leaves and seeds. Rue was held in high esteem by the ancients, and was an ingredient of the celebrated antidote of Mithridates, king of Pontus. Pliny notices it in his *Natural History* as one of the best medicinal herbs; and also mentions the fact of the poisonous effects of the juice, when taken in large quantity. Hippocrates considered Rue as a resolvent and diuretic; and notices it in his chapter on female diseases. By the modern Greeks it is called *Peganon*, and as a medicine for epilepsy it is said by them to be valuable. In India the dried leaves are used by natives as a fumigatory for catarrhal affections in children; and in the fresh state as a remedy in the first stage of paralysis; powdered, and in conjunction with aromatics, in dyspepsia; with camphor and the sugar of *Borassus flabelliformis* it is considered to be inimical to the *fœtus in utero*, an opinion which was also entertained by Dioscorides. At the present day, as formerly, it enjoys great celebrity as an antispasmodic, emmenagogue, and anthelmintic, a celebrity which it owes to its volatile oil. In flatulent colic, hysteria, and infantile convulsions it has been used with success.—(*Lindley, Pereira, Ainslie, Royle.*)

Ruta tuberculata, *Forsk.*; *Boiss Fl. Orient. i.* 939; *Hk. Fl. Br. Ind. i.* 485. *Tuberculated Rue.*

Linn. Syst. *Decandria Monogynia.*

Vernacular—Sudab, *Hind., Sind.*

Stem erect, woody, much branched; branchlets and inflorescence puberulous and glandular; leaves nerveless, oblong, linear-oblong, or spathulate, ½–1, pubescent; cymes dichotomously branched; flowers short-pedicelled, except the centre one of each cyme, which is sessile.

Common on the Sind Hills. Used for the same purposes as *Ruta graveolens.*

N. O. 177. XANTHOXYLACEÆ,—*XANTHOXYLS*. Lind.—Bal. 64.

Xanthoxylon hostile, *Kunth.* *Tooth-ache Tree.*

Linn. Syst. *Diœcia Pentandria.*

The seed and bark.

Vernacular—Tejbul, Zaymoor, *Pers.*; Timbur, *Hind.*

A native of Nepaul and other mountainous countries of Bengal, Rohilkhund, and Oude, the Himalayas, and Khassia Hills, and many parts of the Punjab to near the Indus from 2,000 to 6,000 feet. Cleghorn observed it in the valley of Giri, among others which are enumerated in the *Punjab Report*, also in Khagan and Hazara, where the aromatic pungent fruit is used as a condiment. Both the fruit and bark are officinal. Honigberger states that pestles are made from the stems of the tree to triturate *Bhang* (Cannabis sativa), which gives the preparation a pungent flavor. The gum obtained from this tree is said to be antidysenteric, and has been employed for closing the mouths of wounds however large or dangerous. Mr. Charles Kite mentions the great benefits derived from its use in a case of weakness after an attack of apoplexy, also of its good effects in debility after epilepsy, also in case of irregular liver, immoderate bleeding at the nose, hysteria, diarrhœa, &c. and Dr. White is said to have ascertained it to be a good pectoral.

The capsules and seeds are employed to intoxicate fish, and are chewed to relieve tooth-ache. In Kamaon a prickle is pushed under the tooth to relieve it. The fruit according to Dr. Stenhouse's analysis contains an aromatic essential oil (*Xanthoxylene*), which, when pure, is a hydrocarbon isomeric with oil of turpentine; and likewise a stearoptine (*Xanthoxylin*) found floating on the water distilled from the fruit, and also separable from the crude essential oil.

All species of Xanthoxylon are aromatic and pungent, and are popularly called peppers where they are found. *X. clava* and *fraxineum* are powerful sudorifics and diaphoretics, and are remarkable for their power in exciting salivation, whether applied to the gums or taken internally. The seeds of *X, budrunga*, a tree of Assam and Sylhet, have spicy flavored seeds, and the fragrance of lemon peel, and are known in India as *Kek-ka-la*.

The unripe capsules of *X. rhetsa* of Ceylon and the hills of Peninsular India have analogous properties to *X. budrunga*.—(*Dr. Stewart, Lindley, Ainslie, Cleghorn Punj. Report, Pharm. of India.*)

N. O. 180. ZYGOPHYLLACEÆ,—*BEAN CAPERS*. Lind.—Bal. 62.

Tribulus terrestris, *Linn.*; *DC. Prod. i.* 703. *T. lanuginosus, Linn*; *W. and A. Prod.* 145; *Boiss. Fl. Orient. i.* 902.

Linn. Syst. *Decandria Monogynia.*

The fruit.

Vernacular—Ghokroo, Hussuk, *Hind.*; Trikundree, *Sind*; Khussuck, *Pers.*; Busteyroomee, *Arab.*; Soodoomstra, *Sans.*

A trailing annual; leaves opposite, abruptly pinnated; leaflets 5–6 pair, oval, closely pubescent; peduncles shorter than the leaf; flowers axillary, on short peduncles, yellow, solitary; petals 5, broad, obtuse; calyx 5-leaved, fruit 5-coccus, each with 2 long and 2 short prickles.

Indigenous in the Punjab, from 3,000 to 5,000 ft. in the Himalaya, and to 10,000 ft. in Thibet. In Upper and Lower Sind and Beloochistan and in the Southern and Western Presidencies it is found prostrate amongst grasses, &c.

The roots and leaves have a somewhat sweetish taste, and are said by native practitioners to possess diuretic properties—and especially the fruit, in reference to which the editor of the *Pharm. of India* states that, in trials made with it by him, it was found in some instances materially to increase the urinary secretion, but in others it exercised no perceptible effect. He also states from the favorite mode of administration adopted by the natives, *i. e.* boiling the fruit and root with rice, so as to form a medicated congee water, and taking it in large quantities, that the amount of fluid may act as a diuretic, irrespective of the presence of any medicinal agent. A red-flowered variety of this plant is common in the southern tracts of the Peninsula, where it is called *Yerra pullero*, and in Sanscrit *Racta Suadanshtra* or *Saodvomstra*—its leaves have the smell of cloves. The young plant of *T. lanuginosus* is in some places in the Punjaub

eaten as a potherb; and the seeds or fruits are used as food, especially in times of scarcity. Bellew states that in the Peshawur Valley they are taken by women to ensure fecundity, and that water viscidified with the fresh plant is drunk for impotence, and an infusion of the stems in gonorrhœa.—(*Dr. Stewart, Ainslie, Roxburgh, Fl. Ind., Pharm. of India, Graham.*)

Tribulus alatus, *Delile*; *DC. Prod. i.* 703; *Boiss. Fl. Orient. i.* 902.

Linn. Syst. *Decandria Monogynia.*

Vernacular—Nindo-trikund, Latak, *Sind.*

A procumbent annual; branches villous; leaves opposite, pinnate; leaflets 5 pairs, subacute; stipules ovate, acute; flowers solitary, on axillary peduncles, yellow; sepals 5, deciduous; petals 5; fruit pyramidal, broadly winged; cocci hirsute, 2-seeded; spines confluent.

Sind, Punjab, Kutch, and Rajpootana, also at Beebeenani (Bolan Pass) in Beloochistan. As the "Gokroo" of the bazaars, the fruits are used for the same purposes as those of *Tribulus terrestris.*

Seetzenia orientalis, *Dcne.*; *Boiss. Fl. Orient. i.* 916.; *Hk. Fl. Br. Ind. i.* 424.

Linn. Syst. *Dodecandria Monogynia.*

A small, prostrate, glaucous herb; leaves fleshy, opposite, ½–¾ in. long, 3-foliolate; leaflets obovate, apiculate; stipules triangular; peduncles axillary, solitary, 1-flowered; sepals 5, linear-oblong; stamens 5; fruit ovoid, or subglobose, pendulous.

Common throughout Sind, and on the Moach plains; also in Kutch.

Peganum harmala, *Linn.*; *Boiss. Fl. Orient. i.* 917; *Dalz. and Gibs. Bom. Fl.* 45; *Hk. Fl. Br. Ind. i.* 486.

Linn. Syst. *Dodecandria Monogynia.*

The seed—Hoormul, Isbund-lahouri, Lahouri-hoormul, *Hind., Sind, Punj.*

A branching, glabrous perennial; leaves alternate, 2–3 in. green, pinnatifidly cut into narrow linear lobes; flowers solitary, axillary, sessile or subsessile; calyx 5-partite, persistent; capsule many-seeded, globose.

Common in Sind, Punjab, N. W. Provinces, Kutch, and Deccan; also in the N. W. Himalaya up to 5,000 feet, in Kashmere, Tibet, Beloochistan, and Afghanistan.

The plant has a strong disagreeable odour and nauseous bitter taste, and is thought by Dr. Landerer (*Pharm. Journ.* 14, p. 369) to approximate in its action to *Cannabis sativa.* The seeds have long held a place in Eastern Materia Medica as a stimulant, emmenagogue, and anthelmintic. In the Punjab they are considered narcotic, and are given in fevers and colic. Mild narcotic properties have also been assigned them, and according to Kœmpfer, delirium, characterized by cheerfulness, is caused by their use in some cases. The Turks use them for dyeing red, and in the Peshawur Valley, according to Bellew, they are burnt near the sick to avert evil influences.—(*Dr. Stewart, Lindley, Pharm. of Ind.*)

Fagonia arabica, *Tourn.*; *DC. Prod. i.* 704.; *F. mysorensis, Roth*; *W. and A. Prod.* 143; *Hk. Fl. Br. Ind. i.* 425.

Linn Syst. *Decandria Monogynia.*

The leaves and twigs.

Vernacular—Drummahoo, *Sind*; Oosturgar, *Hind.*

A small spinous plant, 2 to 2½ ft. high, with linear convex leaflets; leaves 1–3 foliolate, opposite, entire, mucronate; stipules spiny; flowers pale-rose.

Indigenous in Sind, and extending along the Arabian and Persian Coast to the Punjab and drier parts of the Gangetic plain, and even to the Deccan and Mysore. The leaves and twigs are used medicinally in Sind, and are supposed to possess cooling properties, and according to the Arabian system of medicine must be good against all disorders arising from heat (external and internal). They are much used in the hot weather to keep the system cool and ward off disorders incident to the season.—(*Hook. and Thomson's Flo. Ind., Stocks in Sind Selection.*)

Fagonia cretica, *W.*; *Fagonia Bruguieri, DC. Prod. i.* 704; *Hk. Fl. Br. Ind. i.* 425. *Cretan Fagonia.*

Linn. Syst. *Decandria Monogynia.*

Vernacular—Spalaghzai, *N. W. Him., Trans-Indus*; Dhama, Dhamya, Dramah, *Sind, Punjab.*

A small spinous plant, with lanceolate, flat, smooth, minute leaflets, much resembling the Jawassa (*Alhagi maurorum*), but with spines shorter, round and fleshy; leaves smaller, lower 3-foliolate, rest 1-foliolate, and seed vessels globular and in 5 divisions; calyx 5-leaved; petals 5, cordate.

Common in Sind, Arabia, and North Africa, and part of the Punjab plains, occurring also in Afghanistan to about 3,000 feet. It is the chief and popular resource of the people in the Hills in cases of fever; but is said not to be as efficacious as the extract from the *Tinospora cordifolia* (Miers). Bellew states that in the Peshawur Valley it is administered to children as a prophyllactic against small-pox.—(*Hook. and Thomson's Flo. Ind., Loudon, Dr. Maxwell in Select Papers of the Agri-Hort. Socy. Punjab, Dr. Stewart.*)

Zygophyllum simplex, *Linn*; *DC. Prod. i.* 705.

Linn. Syst. *Decandria Monogynia.*

Vernacular—Aletthi, *Punj., Sind*; Putlanee, *Sind.*

An evergreen shrub, 2–3 feet high; leaves opposite, fleshy, with double leaflets, stalked; leaflets cylindrical, fleshy, smooth; petals 5, acuminate; calyx 5-leaved; capsule 5-celled.

Common in Sind and parts of the Punjab and Kutch. Edgeworth states the seeds are swept up off the ground and eaten by the poor as food. Dr. Stocks, amongst others, enumerates this as a camel fodder plant, which is said to be eaten greedily. The Arabs beat up the leaves in water, and apply the infusion in diseases of the eyes.—(*Dr. Stewart, Stocks, Loudon, Lindley.*)

Zygophyllum coccineum, *Linn.*; *DC. Prod. i.* 706; *Hk. Fl. Br. Ind. i.* 425.

Linn. Syst. *Decandria Monogynia.*

An evergreen shrub, 1–2 feet high; leaves joined in pairs, stalked; leaflets fleshy, clavate, minutely powdery; stipules triangular, scarious; flowers white.

Sind and along the Coast, Kutch, and Mekran. A camel fodder plant.

N. O. 181. ELATINACEÆ,—*WATER-PEPPERS.* Lind.—Bal. 27.

Elatine æstivosa, *Wight Ic. t.* 222; *Bergia æstivosa, W. and A. Prod.* 41; *Hk. Fl. Br. Ind. i.* 251.

Linn. Syst. *Decandria Decagynia.*

Annual; with slender divaricate branches; leaves opposite, oblong or narrow-obovate, faintly serrate; flowers solitary or 2–4 together, pink; sepals lanceolate, denticulate, with membranous margins.

Sind, and the Punjab, in marshes.

Bergia odorata, *Edgew. in Journ. As. Soc., Beng.*; *Boiss. Flor. Orient. i.* 783; *Hk. Fl. Br. Ind. i.* 251.

Linn. Syst. *Decandria Decagynia.*

A diffuse, rather woody, annual with an aromatic odour; bark papery, deciduous; leaves opposite, sessile, thick, margins crenate-serrate; flowers fascicled, pedicelled, 2–8 together; sepals 5, ovate; seeds numerous, minute, shining.

Sind—One-tree tank near Kurrachee, and other large marshes.

ALLIANCE 36. *GERANIALES.*

N. O. 183. LINACEÆ,—*FLAXWORTS.* Lind.—Bal. 55.

Linum usitatissimum, *Linn.* *Common Flax.*

Linn. Syst. *Pentandria Pentagynia.*

The seed.

Vernacular—Ulcee, Kuthan, *Hind.*

The native country of this valuable annual is not positively known. It is said to be a native of the Old World, where it has been cultivated from the remotest antiquity, and to have come originally from those parts of Egypt which are exposed to the inundations of the Nile. The process of growing flax, steeping and beating the stalks, and manufacturing into thread, cordage, cloth, &c., together with the looms they worked on, which were of the simplest kind, are all depicted in the paintings of the Egyptian tombs. As in former times, so at present, it is cultivated in Egypt, and is becoming every day of greater importance In India it has also been cultivated from very early times, not as in Europe for the fibres, but chiefly for the seeds and oil. In Russia it is grown to a greater extent than in Great Britain, and forms a considerable export to the United Kingdom. In India the earliest attempt to produce flax was made by Dr. Roxburgh, by whom some very valuable and interesting experiments were made as to the qualities of the different fibres, and on various substitutes for hemp and flax. (See *Fibrous Plants of India.*)

In the Punjab and Sind its cultivation has been attended with very successful results. It appears from Dr. Jameson's report that he had cultivated it on a small scale in the Punjab, from seeds procured from Russia, and that the fibres obtained were of a superior description. He says: "There is nothing to prevent this country supplying both flax and hemp on a vast scale. In the Punjab thousands of acres are available, and from its means of producing both flax and hemp this part of India will always be able to compete with other countries." In Sind, and the Punjab also, October and November are the months in which the seed has generally been sown; and the soil selected for the cultivation is the lowland within the water mark of inundation; the usual system of sowing being to scatter broadcast.

Linseed, for which the plant is chiefly cultivated in India, is mentioned by Alcman

in the seventh century B. C., the historian Thucydides, and Pliny, as having been used as food, as at the present time it is in Abyssinia, where it is roasted and eaten, also in some parts of India. It is employed in native medical practice in the Punjab in asthma, and in European practice in the form of poultice; in infusion (linseed tea) as a demulcent. The most important constituent of linseed is the fixed oil it contains, amounting to about one-third of its weight, obtained by expression, which may be either cold-drawn, or after the seeds have been subjected to a heat of 200°. The former, as in the case of cold-drawn castor oil, is paler, and with less odour and taste than that prepared by heat; which, according to Dr. Sace, is composed of *margaric* and *oleic acids*, combined in equal equivalents with *acroleine*; but the *oleic* of linseed differs from that of other fatty bodies.

Linseed oil is used as a varnish, and by natives for burning in lamps. It is emollient and cathartic, but rarely administered internally.

The oil-cake (Kullee, *Hind.*), after expression of the oil, is used for fattening cattle. Given to cows with bran is said to improve the milk.—(*Royle Mat. Med., Royle Fib. Plants, Lindley, Wilkinson's Ancient Egyptians, Report of the British Association*, 1867, *Asiatic Researches* vol. X, p. 1, *Pharm., Pharm. of Ind., Edin. Disp., Dr. Stewart, Loudon.*)

N. O. 187. GERANIACEÆ,—*CRANESBILLS.* Lind.—Bal. 54.

Monsonia senegalensis, *Guill and Perr*; *Boiss. Fl. Orient. i.* 898 *Monsonia lawiana, Stocks*; *Calc. Journ. Nat. Hist*; *Hk. Fl. Br. Indk i.* 427. *Senegal Cranesbill.*

A diffuse annual, with pubescent and grandular branches; leaves ¾–1½ in., opposite, long petioled, obtuse or mucronate, repand-toothed, pilose and pubescent beneath; peduncles long, deflexed at the bracteole; rarely 2-flowered; sepals obovate, densely pubescent; petals 5, violet, 3-veined; stamens 15, monadelphous; carpels beaked, dehiscent, roughly hairy.

Sind, Deccan, N. W. Provinces, and Beloochistan.

Monsonia heliotropoides, *Cav.*; *Boiss. Fl. Orient. i.* 897; *Hk. Fl. Br. Ind. i.* 428. *Heliotrope-leaved Cranesbill.*

A diffuse annual; leaves petioled, ½–1 in. long, ovate-cordate or rhomboid, minutely-toothed, silky and villous beneath; petiole covered with long, white, deciduous hairs; sepals oblong, hoary, mucronate; stamens 15, slightly 5-adelphous at the base.

Sind Hills, Punjab, and beyond the Indus in Waziristan.

Erodium cicutarium, *Leman*; *DC. Prod. i.* 646; *Hk. Fl. Br. Ind. i.* 434. *Hemlock-leaved Cranesbill.*

Stem prostrate, diffuse, hairy, glandular; branches short, sometimes 2–3 ft.; leaves oblong, pinnatisect; pinnules pinnatifid, 7–11 pairs, sessile; peduncles many-flowered; petals unequal, purple; sepals 5-nerved, mucronate; stamens 5; stamenoides 5; carpels indehiscent, scabrous outside.

Sind, and Punjab, to Simla, ascending to 8,000 feet near Iskardo.

N. O. 188. CARYOPHYLLACEÆ,—*CLOVEWORTS*. Lind.—Bal. 28.

Gypsophila vaccaria, *Linn.*; *Wall. Cat.* 1503; *Saponaria vaccaria, Linn.*; *Boiss. Flo. Orient. i.* 525; *Hk. Fl. Br. Ind. i.* 217. *Perfoliate Soapwort.*

Linn. Syst. *Decandria Digynia.*

A sparingly-branched, glabrous annual; leaves flat, oblong or ovate-lanceolate, sessile, rounded at the base; flowers erect on slender pedicels, in dichotomous cymes; cymes corymbose, many-flowered; calyx ½ in. with 5 broad green nerves, ventricose in fruit; calyx teeth triangular, margins scarious; petals erose, rosy; capsule oblong, 4-toothed; seeds black, globose, granulate.

Common as a field weed in Sind. The mucilaginous sap of the plant is used as soap by the natives for washing clothes, and is said to be an efficacious cure for itch.

N. O. 189. ILLICEBRACEÆ,—*KNOTWORTS*. Lind.—Bal. 98.

Illicebrum verticellatum, *Burm. Ind.* 66; *Rheede. Hort. Mal. X. t.* 31. *Whorled Knot-grass.*

Linn. Syst. *Pentandria Monogynia.*

A creeping annual; stems filiform, smooth; leaves oblong, fleshy, opposite; flowers yellow, subsessile, terminal, solitary; calyx surrounded by a 4-leaved, bearded involucre.

Sind, Kutch, Punjab, and N. W. Provinces, generally in bogs and marshy places.

Said to have stupifiant effects if eaten (*Roxb.*), and to be worth cultivating for the beauty of its blossoms. The fresh leaves are used medicinally, and prescribed as an external application in erysipelas.

Polycarpæa staticæformis, *Hochst. and Steud*; *Polycarpæa spicata, Wight and Arn. Ann. Nat. Hist. iii.* 91; *Hk. Fl. Br. India i.* 246.

Annual; 2–5 in. high, glabrous; branches filiform; leaves ovate, spathulate, fleshy, petioled; cymes densely fascicled, long, peduncled, ½ in. dia.; flowers subsecund, crowded, scarious, white; sepals lanceolate, longer than the petals.

Sind, and the Western Peninsula

Polycarpæa corymbosa, *Lamk.*; *DC. Prod. iii.* 374; *W. and A. Prod.* 358; *Hk. Fl. Br. Ind. i.* 245. *Corymbose Cockscomb.*

A decumbent, suffructicose, diffuse annual; branches hoary with pubescence; leaves narrow, linear, acute or obtuse; flowers dense, in terminal cymes. Probably a variety of *Staticæformis.*

Polycarpon lœflingiæ, *Benth. and Hook*; *Hk. Fl. Br. Ind. i.* 245; *Lœflingiæ Indica, Roxb. Fl. Ind. i.* 165.

Linn. Syst. *Triandria Monogynia.*

A diffuse annual, more or less pubescent; leaves opposite, sessile, subverticelled, cuneiform; flowers terminal, fascicled, sessile in the axils of the branches.

Common in Sind, N. W. India, the Western Peninsula, and Ceylon.

ALLIANCE 37. *SILENALES.*

N. O. 190. PORTULACEÆ,—*PURSLAINS.* Lind.—Bal. 97.

Portulaca oleracea, *Linn.*; *Roxb. Fl. Ind. ii.* 463. *Small Purslain.*

Linn Syst. *Dodecandria Monogynia.*

The seed.

Vernacular—Koolfa, Loonia, Loonuk, Nonkha, *Hind.*; Buklut-ul-hakima, *Arab.*; Burra-lonia, *Beng.*; Toork, *Pers.*

A diffuse annual, with prostrate branches, and scattered, wedge-shaped leaves and minute or no scarious nodal appendages; flowers sessile; petals 5, small, yellow; seeds numerous; calyx bifid.

Common in Sind and all over India. It has been used from all antiquity as a pot-herb and as a salad on account of its cooling and antiscorbutic qualities. The ancients thought the seeds steeped in wine to be emmenagogue. In Jamaica it is given in burning fevers, and Barham states that the leaves bruised and applied to the temples allay excessive heat, and such pain as is occasioned from want of rest and sleep; also that the juice made up into pills with gum Tragacanth is of use in the spitting of blood. In Cochin China and the West Indies it is frequently used as a stomachic and as a provocative of the menses, as well as an emollient and diuretic.—(*Lindley, Roxb., Fl. Ind., Anislie, Dr. Stewart.*)

Portulaca tuberosa, *Roxb. Fl. Ind. ii.* 464; *Hk. Fl. Br. Ind. i.* 247. *Tuberous-rooted Purslain.*

Linn. Syst. *Dodecandria Monogynia.*

Vernacular—Loonuk, *Sind.* The Seed—Dhamnee.

Perennial; root tuberous, villous, slightly fusiform, 2–3 in.; stems spreading; leaves alternate, fleshy, linear; nodal appendages setose, brown; flowers yellowish pink, sessile, in terminal clusters, surrounded by a whorl of about 8 leaves; seeds black, granular.

Common in Sind, Punjab, and the Western Peninsula.

The fresh acid leaves are used medicinally; an external application is prescribed by native practitioners in erysipelas and an infusion in dysuria As a potherb it is considered superior to *P. oleracea.*

N. O. 191. POLYGONACEÆ,—*BUCKWHEATS.* Lind.—Bal. 176.

Polygonum aviculare, *Linn.*

Linn. Syst. *Octandria Trigynia.*

The seed.

Vernacular—Eudranee, Bigbund, Hunraj, *Hind.*; Kesru Bandooke, *Punj.*

The species under notice is indigenous in Europe, China, Japan, N. W. Himalaya, Kashmere, Punjab, and the Deccan. In China its dried root is used as a pectoral. In Japan, according to Thunberg, a blue dye, not much inferior to indigo, is prepared from the plant. In the Punjab there are abundant varieties on the plains, where in spring, with its myriads of flowers, it forms masses of pink wherever water has stood, up to 12,000 ft. in the Himalaya, and considerably over that in Thibet. In Chumba it is applied externally as an anodyne, and Honigberger states that it is officinal in Kashmere. The seeds are said to be powerfully emetic and purgative; but this is

doubted by Meisner. *P. bistorta* (maslun, bilauri, unjibar, *Punj.*) is an useful astringent; a decoction may be employed in gleet and leucorrhœa as an injection; also as a gargle in relaxed sore throat and spongy gums. It is often used as a lotion to ulcers attended with excessive discharge. Internally it has been employed, combined with gentian, in intermittents. It may also be given in passive hemorrhage and diarrhœa. The leaves of *P. nepalensis* in Kangra are applied to swellings, and those of *P. polystachum* eaten as a potherb. In Lahore *P. tortuosa* yields a yellow dye, and is browsed by goats.

The seeds of *P. barbatum* are employed in Malabar and Canara to ease the griping pains of colic.—(*Dr. Stewart, Lindley, Loudon, Ainslie.*)

Rheum palmatum, *Linn* *Rhubarb.*

Linn. Syst. *Enneandria Trigynia.*

The root.—Rhubarb.

Vernacular—Revund Chenee, *Hind.*

This plant is indigenous in Chinese Tartary and Thibet, and is easily distinguished from the others by its roundish, cordate, half-palmate leaves, with the lobes also deeply cut. It is *one* of the sources of the officinal rhubarb, the true source, notwithstanding the enquiries and labors of several naturalists, not having yet been ascertained. Duncan in his supplement to the *Edinburgh Dispensatory*, p. 89, gives a sketch of the opinions of naturalists regarding the source of the drug.

In 1732 some plants said to be the true rhubarb, sent from Russia to Jussieu at Paris, proved to be the *Rheum undulatum* of modern botanists, described by Linné under the title of *R. rhabarbarum.*

Some time afterwards Kaaw Boerhaave procured seeds from Tartary, and the results of the sowing were two species of *Rheum,—undulatum* and *palmatum.*

Dr. Mounsey of Petersburgh also sent in 1762 seeds to Dr. Hope, which vegetated and were cultivated with great success. These also proved to be *R. palmatum*; and Dr. Hope reported the perfect similarity of the root with the best foreign rhubarb in taste, smell, color, and purgative qualities (*Ph. Tr.*, 1765, p. 290). Upon these authorities these two species have been generally indicated in the European Pharmacopœias as the source of the Asiatic rhubarb, but accurate naturalists were not altogether satisfied. Pallas's inquiries in Bucharia showed that the leaves of *R. palmatum* were unknown to them; and that those of the true rhubarb were round, and with only a few incisions on the margin. This description agreed best with *Rh. compactum*; but its roots were *white*, and hence it was named *Leucorhizon.*

The plant is said not to grow tall, and to have round leaves, which are toothed on the margin with almost spinous points.

Very recently another species of rhubarb, found on the Himalaya mountains, has been supposed to produce the true rhubarb It was first described by Mr. Don. He found it to be identical with the *Rh. emodi.* of Dr. Wallich. It does not, however, appear to be the true rhubarb. At least the roots tried by medical officers differ from the true rhubarb in appearance and power. The latest notice of the Himalayan rhubarb is by Dr. Royle:—

"By my plant collectors rhubarb has been found in large quantities on the Choor mountain in lat. 30°, and at an elevation of about 9,000 feet. There it has likewise been seen by Mr. Gerard growing in rank luxuriance, also in vast beds on the hither slope of the Himalaya; and beyond them he has found the plant far more majestic, and the leaves larger and more spreading. The tableland of Tartary, he informs me, is covered with rhubarb at the height of 16,000 feet; and there is abundance of it at Ladak in lat. 37°; from whence some of very fine quality was sent to Captain Kennedy by Mr. Moorcroft; indeed, it appears that wherever travellers have been, there the rhubarb has been seen, and we may infer that it is to be found at the same latitude and elevation in all the intervening spaces.

"In ascending Mount Albours near Teheran, M. Olivier found the ground covered for a long way with a species of rhubarb which the Persians call Riebas (*Rheumribes*). They use the whole plant as a remedy in inflammatory diseases and ardent fevers; and employ the foot stalks as an aliment. They were the first things offered to M. Olivier

at Kermanchah. They are eaten raw, after merely peeling off the skin. They are very agreeable to the taste, slightly acid, and very refreshing. They are confected with sugar, honey, and raisin-must, are preserved during the whole year, and are sent to the south of Persia where the plant does not grow."

Dr. Stewart notices three species—*R. emodi, moorcroftiana,* and *spiciforme,* as yielding rhubarb, and says :—

"At least two species of rhubarb are frequent in parts of the Punjab, and Himalaya from 6,200 to 14,000 feet, the second named occurring still higher, from 15,000 to 17,000 feet, but these have got into confusion in my hands, and their separate identity is therefore not established. In some parts of the hills no portion of these plants is used, but in most the stalks are eaten, either boiled with water or pounded and mixed with salt and pepper, and in Hazara the dried leaves are boiled with water and eaten with meat. At one place in Chumba and in Lahoul the flowers are eaten. The officinal *ribes* of the drug-sellers consists of the dried stalks from Kabul, which may partly be produced by *R. ribes,* Gron. In Afghanistan the plant is always wild, and appears to grow abundantly in many parts. When green, the leaf stalks are called *rawash,* and, when blanched by heaping up stones and gravel round them, are called *chukri*; when fresh, (in which state they are sometimes brought to Peshawur in spring), they are eaten either raw or cooked, and they are also dried for use to be eaten with other food, and are sometimes made into a preserve. The officinal root is imported into Afghanistan and India to be used as a purgative. In the former country, however, the people appear to have no idea that it is the root of a plant similar to their own *rawash,* and the roots of the latter are, according to Bellew, spongy and tasteless. Aitchison states, that although in Lahoul the *R. emodi* is not used medicinally, yet its leaves, even when cultivated in a garden, had medicinal effects when eaten in salad. It is stated by Moorcroft (?) that the Bhotias of Garhwal apply the powdered root to wounds and bruises, and that they use it with *majit* (*Rubia tinctoria*) and potash for dyeing red."

The greater part of the rhubarb of commerce grows in Chinese Tartary on the mountains and plains surrounding Lake Kokonor, especially in the province of Gansun, and is gathered in summer from plants of 6 years. In autumn it is brought by the Bucharians (who fell under the dominion of the Chinese about a century ago) from Sinin, and from thence sent to the Russian frontier town of Kiachta and to Pekin, Canton and Macao, and the route is by the Indus or the Persian Gulf to the Red Sea and Alexandria. It is now purchased for the European market chiefly at Hankow, whence it is sent down to Shanghai and shipped to Europe. The exports in 1872 amounted to 3,167 piculs (1 picul is 133⅓ lbs.).

Rhubarb appears, as regards its chemical and therapeutic properties, to be a mixture of resin, extracted matter, and chrysophanic acid.

Plaff, by the action of water on it, obtained a substance of a deep brown color, brilliant, opaque, and of a peculiar bitter and nauseous taste, which did not redden tournesol, and called it Rhabarbarine. Rhubarb is one of the most common and a valuable purgative—it is also used as a tonic astringent, and much so as a laxative for children.—(*Royle, Duncan, Disp. Pharm., Pereira, Mat. Med., Dr. Stewart, Cleghorn, Pharm. of Ind.*)

Rumex obtusifolius, *Linn.* *Broad-leaved Dock.*

Linn. Syst. *Hexandria Trigynia.*

A fusiform, rooted perennial; stem erect, 2–3 feet high; leaves alternate, petioled, oblong, cordate, obtuse and crenate; verticels numerous, approximate; flowers numerous, drooping; valves toothed, all grained.

Common in Sind, Deccan, Egypt, and Kashmere.

Though a weed of the worst description, is eaten as a potherb by natives. Roots used as a dye, and in medicine under the name of *Radix spathiacuti* in cutaneous affections.

Rumex conglomeratus, *Murray. Conglomerate-flowered Dock.*

An annual; 1–2 feet high; leaves lanceolate, slightly pubescent; flowers hermaphrodite, conglomerate; verticels lanceolate, all grained.

Common in Sind and the Punjab. Eaten as a potherb.

Rumex Ægyptiacus, *W. Egyptian Dock.*

Linn. Syst. *Hexandria Trigynia.*

Vernacular—Chooka.

An annual; differs from the last in having lanceolate leaves and trifid setaceous valves; roots used as a dye.

Occurs in Sind, Deccan, Arabia, and Egypt.

Rumex vesicarius, *Roxb. Bladder Dock.*

Linn. Syst. *Hexandria Trigynia.*

The seeds.

Vernacular—Ambaree, Chooka, Chooka-ke-Bhajee, *Dec., Hind.*; Hubbuck-khorasanee; Humbeejeet, Hamaz, *Arab., Egypt.*; Turshah, *Pers.*; Chooka, *Sind*; Sooree, *Cing.*, Taloony, *Punj.*

An annual; from 1 to 2 feet high; leaves oblong, sagitate; flowers diœcious; all the valves large, membranoous, reflexed.

Wild and cultivated in Sind; common in arid places, in the salt range and Trans-Indus to 3,000 feet, also in Southern India, Arabia and Egypt. Cultivated in the Deccan. In some places is troublesome to cultivators.

This plant has received the name of sorrel in India owing to its resemblance to *R. acetosa* in taste and other qualities. It is used by the natives as a potherb, and as a medicine is considered cooling and aperient, and to a certain extent diuretic. The Peruvians according to the *Flora Peruviana* give an infusion of it in cases of depraved habit of body.—(*Ainslie, Lindley, Dr. Stewart.*)

Calligonum polygonoides, *Linn.*

Linn. Syst. *Dodecandria Trigynia.*

Vernacular—Phog, *Sind, Punj.*; Balanja, *Afg.*

A small shrub; 3–4 ft. high; with numerous flexuose branches; leaves few, if any, small, fleshy, generally none; stipules sheathing; flowers 3–4, in axillary peduncles; pedicels fasciculate; calyx penta-partite; filaments about 14, united at the base; ovary superior, 4-cornered; style 4; nuts oblong, setaceous.

Common in Sind, Beloochistan, Afghanistan, Persia, Arabia, Egypt, and Punjab.

The flowers of this plant are collected in Sind, Beloochistan, and Afghanistan, and eaten either made into bread or fried in clarified butter or cocoanut oil. The roots bruised and boiled with the addition of catechu (Kat, *Hind.*) are used to make a gargle for sore gums.

ALLIANCE 38. *CHENOPODALES.*

N. O. 192. NYCTAGINACEÆ,—*NYCTAGOS.* Lind.—Bal. 169.

Mirabilis jalapa, *W. Common Marvel of Peru. Four-o'clock Flower.*

Linn. Syst. *Pentandria Monogynia.*

The root.

Vernacular—Goolabbas, *Hind., Sind, Punjab*; Zahr-ul Ajul, *Arab.*; Krustna Keli, *Beng.*

This beautiful perennial is said by Dr. Fleming (*Cat. Ind. Med. Plants*) not to be indigenous in Hindostan, but all the varieties are cultivated as an ornament to the gardens in Bengal. Miller says it is a native of both the East and West Indies as well as China, Cochin China, Africa and Peru, and Wildenow speaking of it says "Habitat in India." In the Deccan and Concan and throughout the Southern and Western Presidencies it is cultivated for its flowers, which are of extreme beauty. In the plains of the Punjaub it is also cultivated, and as noted by Madden is naturalised in many places in the Himalaya up to near the Jhelum. In waste ground near villages and on the hills, great beds may frequently be seen with flowers of a variety of colours. In Sind it is not cultivated except in gardens. The plant was at one time supposed to be the source of the officinal jalap, which is now ascertained to be the root of a convolvulus. The tuberous root of the plant under notice has a faint and rather sickly smell and taste. In the *Taleef Shureef* the root is stated to be a mild and efficient purgative, equal, if not superior, to common jalap. Subjected to clinical trials by Dr. Shoolbred and Hunter it has been found unworthy of attention in this or any other character. Ainslie adds that Loureiro said of it in his *Flora Cochin China* (vol. I, p. 101): "*Hæc radix non est apta ad medicinam.*" The bruised leaves are used throughout India by natives as a poultice to hasten suppuration of abscesses or boils, and in the Punjab a medicinal conserve is said to be made of the root. Thunberg states that with the seeds of this plant the Japanese prepare a sort of white paint for their complexion.—(*Ainslie, Pharm of Ind., Dr. Stewart.*)

Boerhaavia procumbens, *Herb.* *Spreading Hogweed.*

Linn. Syst. *Diandria Monogynia.*

Vernacular—Shwet-parna, *Beng.*; Gadda-purna, *Hind.*; Pandarwash, *Punj.*; Nakbel, *Punj., Sind.*

A low creeping plant; root fusiform; perennial; stem round, pubescent; branches procumbent, smooth; leaves vary in size, ovate or cordate, covered with whitish pubescence underneath; flowers terminal, in long peduncled heads, cream color.

This is a common weed in Bengal and Madras, and is very troublesome to cultivators, the long fusiform roots striking so deep as to render it no easy task to dig them up. It is common also in the Punjab plains, to 4,000 feet in the Himalaya, and in lower and central Sind it is extremely abundant, and spreads on the ground to the extent of from 4 to 5 feet. It is browsed by camels, goats, and oxen, both in the Punjab and Sind. In Madras it is eaten as a potherb. On the Jhelum and in Sind it is used as a cooling medicine.—(*Lindley, Ainslie, Dr. Stewart, Rox. Fl. Ind.*)

N. O. 194. AMARANTACEÆ,—*AMARANTHS.* Lind.—Bal. 170.

Celosia argentea, *Linn.* *White or Silvery-spiked Cockscomb.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Shwet-moorga, *Beng.*; Debkotee, Sufaid Moorgkes, Sarwaree, *Hind.*; Sarwalee, *Punj.*; Surwalee, Ucha-kookur, *Sind.*

An erect annual; leaves linear, lanceolate; stipules falcate; peduncles angular; spikes scarious, ovate, subcylindric; nectary with five short toothlets, alternate with the long antheriferous divisions; sepals 3; capsules opening horizontally, 1-3 seeded.

This is a common weed in cornfields almost throughout India, generally seen in the Deccan growing among bajree (*Pencillaria spicata*) crops. In the Punjab plains, as in Sind, it is also found as a field weed; and occasionally, according to Dr. Stewart,

to 5,000 feet in the Himalayas. The double variety is grown in gardens, together with the red variety *C. cristata* (*lall moorga*). It is used as a potherb by the poorer classes. The seeds are said to be an efficacious remedy in diarrhœa. The flowers of *C. cristata* are astringent, and are used in cases of diarrhœa, excessive menstrual discharges, and other similar disorders.—(*Loudon, Lindley, Graham, Dr. Stewart.*)

Ærua lanata, *Juss*; *Illicebrum lanata, Linn. Willd. sp. i.* 1204.; *Achyranthes lanata, Roxb. Fl. Ind. i.* 677. *Woolly Amarantus or Ærua.*

Linn. Syst. *Pentandria Monogynia.*

The flowering tops and root.

Vernacular—Booee, *Sind*; Boee-kullan, Hazmay, *Punj.*; Kul-kejar, *Dec.*; Chaya, *Beng.*

Annual, 1–3 feet high, flowering all the year round; stems erect; herbaceous, covered with woolly pubescence; leaves alternate, petioled, ovate-oblong, somewhat pointed, tapering at the base, woolly on both sides, midrib and veins thick and prominent on the under-surface; calyx woolly; spikes axillary, oval, and woolly.

Found in Bengal, Deccan, Ceylon, and Madras. Is common throughout Sind to 2,500 feet; and, with two other species, occurs in the Punjab plains and occasionally to 3,000 or 4,000 feet on the outer hills up to, and beyond, the Indus. It is subject to woody galls. The flowers or woolly tops of this species are by natives in Sind substituted for cotton in making pillows. The bruised root applied to the temples is said to be very useful in allaying headaches. The natives on the Malabar Coast reckon it among their demulcents, and prescribe it in strangury.—(*Dr. Stewart, Ainslie, Roxb., Graham.*)

Achyranthes aspera, *Willd.* *Rough Chafflower.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Chirchiria, *Beng.*; Neagam, *Egypt*; Chirchooree, *Hind.*; Kutri, Baggiara, Putkunda, *Punjab.* The tops, Apamarg, *Punj.*; Margia, *Sind.*

A biennial; 3–4 feet high; with a shrubby stem; leaves opposite, short-petioled, obovate, acute, pubescent, dotted underneath; flowers numerous; bracts membraneous, ovate; calyx 5-leaved, incomplete, in rough terminal spikes, reflexed; stigma bifid; seeds solitary.

A troublesome weed in every part of India, especially in the rainy and cold season, but in some measure all the year. Common in Sind and in the Punjab plains, and occurs to 2,500 feet (5,000 feet Thomson) in the Himalayas. Ainslie says the plant as it grows in Sicily differs a little from the Indian variety, but they are no doubt one species. Astringent and diuretic properties are assigned to the plant. Of the former little is known, although it is said to be used successfully in native practice in menorrhagia and diarrhœa. As a diuretic it has been favorably reported on, and in dropsical cases it has been used with success. The plant incinerated yields a considerable quantity of potash, from which circumstance it is called *Apamarga* in Sanskrit, *i.e.* the washerman, the ashes being used for washing clothes. Dr. Shortt reports having used the flowering spikes as a local application in scorpion stings, for which purpose it is used in Oude; and Madden states it is there regarded as a protection from scorpion stings. In conjunction with an infusion of ginger the ashes are esteemed in dropsical cases. *A. fructicosa* is said to have the same properties. In Sind it is used by native foresters as an application to wounds caused by Babool thorns, which it is said occasion a stinging pain not unlike that of the scorpion sting.—(*Ainslie, Roxb., Lindley, Pharm. of Ind*)

Achyranthes alternifolia, *W.*

Vernacular—Mooree, *Sind.*

A diffuse annual; leaves ovate, oblong, alternate, smooth petioled, margins colored; petioles channelled; spikes axillary; flowers solitary, red; sepals 5; bristles callous.

Sind, Arabia, Egypt, Deccan, and Coromandel Coast.

Alternanthera sessilis, *R. Br.* *Sessile Alternanthera.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Sanchi, Shalanchi, *Hind., Beng.*

A creeping annual; leaves sessile, ovate, lanceolate, glabrous; flowers minute, aggregated in dense clusters on axillary sessile spikes; perianth ovate, acuminate, bracteated; sepals 5, equal, ovate, acute; capsules toothed.

Indigenous in Bengal, Malabar, Guzerat, Sind, and perhaps the Punjab also. It is a common weed, greatly prized as a potherb.—(*Roxb., Dr. Stewart, Graham.*)

Desmochæta lappacea, *Roxb. Fl. Ind. i.* 673. *Bur Desmochæta.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Dayah.

A prostrate annual; with pubescent spreading stems; leaves opposite, short-petioled, ovate, acuminate; flowers with long purple hooked bristles, in terminal spikes, fasciculate; sepals, 5.

Common in Sind, Bengal, Deccan, and Malabar Coast.

Digera arvensis, *Forsk*; *Griff. Not. Ad. Pl. As.* 343.

Linn. Syst. *Monœcia Tetrandria.*

Vernacular—Tandala, *Sind*; Tandala, Leswa, *Punj.*

A decumbent, ramous annual, with a flexuose subterete stem; leaves petioled, alternate, ovate-lanceolate, obtuse; petioles slightly pubescent; flowers axillary, solitary, greenish purple.

Common in Sind, occurs also in the Punjab plains, and to 2,500 feet in the Himalaya. Frequently eaten as a potherb.—(*Dr. Stewart.*)

N. O. 193. PHYTOLACACEÆ,—*PHYTOLACADS.* Lind.

Limeum indicum, *Stocks MS.*; *Oliv. Fl. Trop. Afr. ii.* 596.; *Hk. Fl. Br. Ind. i.* 664. *Indian Limeum.*

Linn. Syst. *Heptandria Monogynia.*

A sub-prostrate, glabrous annual; leaves spathulate, round, $\frac{1}{4}$–$\frac{1}{2}$ in., opposite, petioled; cymes sessile; flowers bracteate; sepals $\frac{1}{8}$ in., roundish, longer than the petals; stamens 7; carpels dehiscent.

Common in Sind and the Punjab; said to be poisonous.

Suriana maritima, *Linn.*; *W. and A. Prod.* 360. *Hk. Fl. Br. Ind. i.* 522.

A woody plant; branches covered with a velvetty pubescence; leaves alternate, entire, linear spathulate, 1 in. long, without stipules, pubescent; flowers hermaphrodite, racemose, terminal, yellow; calyx 5-partite, imbricate; petals 5; stamens 10, unequal; carpels 5, distinct, 1-seeded.

Found on the coast of Sind and Kutch and throughout the shores of India; a littoral shrub.

Amaranthus tenuifolius, *Willd. iv.* 381; *Roxb. Fl. Ind. iii.* 602. *Fine-leaved Amaranth.*

Linn. Syst. *Monœcia Pentandria.*

A diffuse annual; leaves wedge-shaped, short-petioled, emarginate, 1 in. long; glomerules axillary; male flowers with a 2-leaved calyx; capsule furrowed.

A field weed in Sind, Kutch, and the Deccan and Concan.

Amaranthus polygamus, *Willd. iv.* 381; *Roxb. Fl. Ind. iii.* 604. *Hermaphrodite Amaranth.*

Vernacular—Chowlai-ka-bhajee, *Hind.*

Cultivated in Sind, Kutch, Rajpootana, Deccan, Concans, Punjab, and nearly throughout India; eaten as a potherb. Other edible Amaranths cultivated are—*Amaranthus oleraceus,* Roxb.; *Tandooljee, Tambree maat,* or Red Bhajee, used as a spinage; *A. caudatus,* Spreng.—"Love lies bleeding"; and *A. tricolor,* 3-colored amaranth, cultivated as an ornamental plant in gardens. The leaves of *A. spinosus,* W. (Prickly Amaranth) Nootee, Mulleera, *Sind, Punj.*, are common in the plains, and used as a potherb by the poor, also those of *A. tristis,* W. (Round-headed Amaranth).

N. O. 195. CHENOPODIACEÆ,—*CHENOPODS or GOOSEFOOTS.*

Atriplex hortense, *Linn.* *Orache.*

Linn. Syst. *Polygamia Monœcia.*

Vernacular—Juree, *Sind*; Soorakka, *Punj.*

In the Trans-Indus it is abundant, and occurs also in the salt range, and from 12,000 to 14,000 feet in Thibet. In Sind (Kurrachee especially), it is commonly wild, and, cultivated, is eaten with much relish as a potherb by natives. Is also one of the camel fodder plants. In Madras and the Deccan the poorer classes subsist almost entirely on it, and several species of *Amaranthus.* In the Peshawur Valley it is commonly used as a spinage, but the seeds are said to be so unwholesome as to cause nausea.—(*Lindley, Dr. Stewart, Loudon, Graham, O'Shaughnessy.*)

Beta vulgaris, *Spreng.* *The Beet.*

Is cultivated in gardens.

Chenopodium album, *W.* *White Goosefoot.*

Linn Syst. *Pentandria Digynia.*

Vernacular—Kul-jah-bhajee, Bathoo-sag, *Beng.*; Bathooah, Loonak, *Punj.*; Ghil, *Sind.*

An erect annual, 2 to 4 feet; with long petioled, rhomboid-ovate leaves, beneath mealy; panicles terminal, contracted, erect, leafy; seeds smooth.

Common throughout India. In the Bengal, Bombay, and Madras Presidencies cultivated as a potherb. In the Punjab plains and apparently to 8,500 feet in parts of the Himalaya, and 13,500 feet in Ladak, it is a common weed; and is often obnoxiously abundant in the cold weather crops in the plains. In Sind, besides this species, there are two others, *C. maritimum*, or *sea blite*, and *C atriplicis* or *purple goosefoot*; the former is burnt with Salsola to produce soda. *Chenopodium vulgare*, a species not uncommon in the Sutlej Valley, at an elevation of 7,000 feet, grows as high as 6 feet, and is also used as a potherb.—(*Dr. Stewart, Roxb., Lindley, Cleghorn Punj. Report.*)

Sueda fruticosa, *Moq.*; *Willd. Spec. i. p.* 316; *Eng. Bot.* 685. *Shrubby Goosefoot.*

Linn. Syst. *Pentandria Digynia.*

Vernacular—Loonuk, Chotee Lanee, Usak Lanee, *Punj.*; Ushuk Lanee; *Sind.*

This is abundant in Sind and in the Central Punjab from the Trans-Indus to the east of the Sutlej, on to Hurriana, and in parts of the Central Punjab it grows to a considerable bush, covering many square miles in places, where its growth is indicative of inferior soil. Edgeworth mentions that *Sajji* could be prepared from this plant, and Dr. Stewart says he was told it is prepared only in small quantities for home use in Montgomery, and Atchinson states that it is at times made from it in Jhelum. In Sind *Sajji-Khar* (crude soda) is prepared from this plant, but with species of *salsola* and *chenopodium* mixed, as that prepared from this plant alone is considered inferior in quality. The plant is subject to woolly excrescences, which are used in conjunction with an empyreumatic oil as an application to sores produced on the backs of camels by the wooden saddle (*pakroh*). The leaves are applied as a poultice in ophthalmia, and used sometimes, infused in water, as an emetic by Sindees.—(*Dr. Stewart.*)

Salsola indica, *Roxb. Fl. Ind. ii. p.* 62. *Indian Saltwort.*

Linn. Syst. *Pentandria Digynia.*

Vernacular—Lanee, *Punj.*; Kharree Lanee, *Sind.*

This is a perennial, an erect growing plant, with much-branched, woody stems; branches diffuse; leaves sessile, linear, acute, semicylindric, fleshy, smooth, ½ inch long and about 1/12 in. broad; flowers small, in terminal leaf-bearing spikes.

This shrub is found all over India in salt marshes and plains. In Sind large tracts are covered with it, *Caroxylon fœtidum* and *Caroxylon Griffithii*. In the Punjab *S. kali*, *Caroxylon Griffithii* and *fœtidum* are the sources of *Sujjikhar*, an impure carbonate of soda. Dr. Stewart in his article on *C. Griffithii* says: "although many square miles of the barren clay tracts of the Central and Southern Punjab are covered entirely with *Salsolaceæ*, from any or all of which Europeans are apt to suppose that *Sujji* is made, yet, as mentioned by Edgeworth, *C. Griffithii* is one of the more rare kinds, only extending a little way east of the Sutlej. As a rule throughout the Punjab this alone is used in making that substance, probably as giving the most abundant outturn. Edgeworth implies that it is common in Bhuttiana to the south of Sirsa, and it is found at 10,000 to 15,000 feet in Thibet (*Hook. and Thom.*). This is also probably one of the two plants whence Sujji is chiefly made in Sind. Sujjikhar or impure carbonate of soda is yielded by incineration by all plants of the *Salsola* genus, a few of the *chenopods* also yield it, as also the genus *Caroxylon* and *Salicornia*. In Sind it is obtained from *Caroxylon fœtidum* (*Motee lanee, Gharo lanee*), *Sueda fructicosa*, the plant under notice, and another undetermined species of *Salsola* called *kontee khar*, and is extensively used in soap-making, calico dyeing, washing, &c. The plants are the favorite food of the camel. In Spain *S. soda* is cultivated for making barilla, but is reckoned inferior to *S. sativa*, which grows on the shores of the Mediterranean, and affords all the best soda consumed in Europe, and is called Spanish or Alicant Soda. The green leaves of *S. Indica* are eaten by natives of the Madras Presidency; and in

some places in the Bombay Presidency, especially on the coast, where it is plentiful. It is considered wholesome, and Roxburgh says, "it must be so, as during times of scarcity and famine it is a very essential article of food of the poor natives; they dress it in their curries, &c. The leaves of the plant alone, the natives say, saved many thousands of lives in the famine of 1792–94."—(*Graham, Roxb., Fl. of Ind., Select Papers A.-H. Society Punj., Loudon, Lindley, Stocks, Dr. Stewart.*)

Salicornia indica, *Roxb. Fl. Ind. i. p.* 86. *Indian Jointed Saltwort.*

Linn. Syst. *Monandria Monogynia.*

A diffuse perennial; with large stems, and rather woody branches; leaves or joints long, succulent, gibbous; spikes terminal, cylindric, erect, obtuse; flowers inconspicuous, opposite, hid by the upper margin of the floral leaf; calyx fleshy.

Common in salt marshes in Sind (Kurrachee) and along the coast, also on the Coromandel Coast, and the lower Concan. The fleshy or succulent joints are pickled at Tanna, Bassein, and other places in the Concan. The plant also furnishes an alkali used in the manufacture of soap and glass.

N. O. 196. PIPERACEÆ,—*PEPPERWORTS.* Lind.—Bal. 207.

Chavica Roxburghii, *Mig.* *Long Pepper.*

Linn. Syst. *Diandria Trigynia.*

The root and immature fruit.

Vernacular—Pipulmool, Pipplie, *Hind., Dec.*; Filfildray, *Per., Sind.*

This is a perennial shrub, indigenous to Nepal, Java, Malabar, Ceylon, Timer, and the Phillipines. Abundant in the woody hills of the Circars as well as at the foot of the Himalayas. Cultivated extensively in Bengal and the Southern Presidency on account of its root and fruit or spike. The latter is the long pepper (*Piper longum*) known to the Greeks and Romans. It has been employed by the Hindoos in medicine from the earliest times, and is still extensively used. It is collected before it reaches maturity, and is found in commerce from about an inch to an inch and a half long, ¼ inch thick, and indented on the surface. It, as well as the root, are esteemed for their stimulant properties. An infusion of the fruit with several other ingredients is administered by native midwives to hasten the removal of the placenta after parturition. On the Coromandel coast it is prescribed in infusion with honey in catarrhal affections. The Arabs consider it as a cardiac. Like black pepper it contains a volatile oil, an acrid resin, and piperine; and like it possesses stimulant and carminative properties, but more powerful. Now chiefly employed as a spice, and in native and veterinary practice.—(*Royle, Pharm., Ainslie, Pharm. of Ind., Roxb., Fl. Ind.*)

Piper nigrum, *W.* *Black Pepper.*

Linn. Syst. *Diandria Trigynia.*

The fruit.

Vernacular—Kalameeree, Meerie, Goolmirch, *Hind., Dec., Guz.*; Goolmirien, *Sind.*

A perennial, climbing shrub, indigenous in Travancore, Malabar and Cochin; and cultivated in Borneo, Sumatra, Java, Siam, and the West Indies. In the south-west of India the plant or pepper vine grows on the sides of the valleys, where the soil is rich and moist. In the 4th century B. C. Theophrastus noticed the existence of two kinds of pepper, probably the black and long pepper of modern times. For centuries pepper has been an article of exportation to European countries from the Western coast of India. It was an article of luxury to the Romans during the Empire, and is frequently alluded to by historians. It is one of the Indian spices on which they levied duty at Alexandria about A. D. 176 (Vincent). Pliny states its price in the Roman market as being equivalent to 4s. 9d. a pound in English money. Pepper

contains an acrid soft resin, and an essential oil; its sharp pungent taste is due to the former, and the odour to the latter.

Piper nigrum is used as a condiment all over India. Also as a stomachic in dyspepsia, flatulence and fevers, and it has been successfully used in vertigo and paralytic and athritic disorders.—(*Ainslie, Drury, Pharm., Pharm. of Ind., Birdwood.*) In cholera a strong infusion of the powdered seed is said to have proved serviceable, especially in stopping the vomiting.

Cubeba officinalis, *W* *Officinal Cubebs.*

Linn. Syst. *Diandria Trigynia.*

The berry—Cubebs.

Vernacular—Kubab-cheenee, Suggun-mirchee, Doomkee-mirch, Kebabeh, *Arab.*; Walgumdris, *Ceing.*

This plant is an inhabitant of Lower Java and the Moluccas. The berries (cubebs) were probably first known through the Hindoos to the Arabs, being the *kudabeh* of the latter, and the kubab-chinee of the former. It is not probable that they were known to the Greeks. (*V. Hindoo-Med.* p. 85.) Dr. Pereira has adduced evidence that they were employed in England five hundred years ago (*Royle Mat. Med. and Ther.*). Dr. Lindley has ascertained that this is the *P. cubeba* of the Linnean herbarium. Blume says that the fruits of this, although of good quality, are not sent to Europe; but those that are furnished by *P. caninum.* The fruit, when dried, resembles black pepper, but is not quite as large. Used chiefly as a remedy in gonorrhœa, leucorrhœa, gleet and vaginal discharges, also successfully in bronchitis. Besides the virtues of cubebs in gonorrhœa, it has been lately discovered to be a most useful medicine in cases of inflammation of the mucous membrane of the intestinal canal, given in conjunction with oxyde of bismuth, also in chronic cases of inflammation of the œsophagus, combined with carbonate of soda. According to Vanquelin's analysis, cubeb contains a volatile oil, which is nearly solid, and of which it yields from 6 to 15 per cent; a resin resembling balsam copaiva, a quantity of another colored resin, and a colored gummy matter.—(*Royle, Ainslie, Lindley, Pharm. of India, Pharm., Roxb., Fl. Ind.*)

N. O. 199. BASELLACEÆ,—*BASELLADS.* Lind.—Bal. 172.

Basella alba, *Roxb. Fl. Ind. ii.* 104. *White Malabar Nightshade.*

Linn. Syst. *Pentandria Trigynia.*

Vernacular—Myal-ka-bhajee, *Hind.*; Poi, *Sind, Punj.*

A twining perennial; leaves cordate, smooth, entire, fleshy; peduncles simple, longer than the leaf; calyx seven-cleft, in two divisions.

Common in Sind, Punjab, and Concan. This and a variety known as the red nightshade (*B. rubra*) are cultivated. Both are employed as potherbs and held in esteem as a substitute for spinage. It is suggested that the purple juice of the fruit of *B. rubra* may be of use as a dye, but it is said to be difficult to fix.—(*Lind., Grah., Roxb.*)

ALLIANCE 40. *FICOIDALES.*

N. O. 200. MESEMBRYACEÆ,—*FICOIDS.* Lind.—Bal. 100.

Glinus lotoides, *Linn.*; *Lamk. Ill. t.* 413; *DC. Prod. iii.* 455; *Mollugo hirta, Thunb. Fl. Cap.* 120; *Hk. Fl. Br. Ind. ii.* 662. *Hoary Glinus.*

Linn. Syst. *Dodecandria Pentagynia.*

Vernacular—The plant, Kothuk, *Sind*; Poprang, Gandee Bootee, *Punj.* The bazaar drug (plant)—Zukhmi-hyut—Kotuk, *Sind, Punjab.*

A procumbent annual; covered with a white, stellate, downy or woolly substance; stem much branched, leafy; leaves ½-1 in., ovate, opposite, petioled; petioles ¼ in.; flowers sessile, or subsessile, axillary; sepals 5, persistent; corolla wanting; capsule oblong, many-seeded.

Sind and the Punjab, Deccan, Senegal, and Egypt. The dried plant under the name of Zukmiyhat is prescribed by native practitioners in Sind for diarrhœa.

Glinus mollugo, *Rheede Mal. X. t.* 24; *Mollugo spergula, DC. Prod. i.* 391; *W. and A. Prod.* 44; *Hk. Fl. Br. Ind. ii.* 662.

Annual; stem diffuse, branching, leafy; leaves whorled, spathulate, petioled; flowers pedicelled; sepals oblong; margins often membraneous.

Very widely distributed, Sind, Punjab, Eastern Himalaya to Ceylon and Burmah.

Gisekia pharnaceoides, *Linn.*; *Mant.* 562. *Trailing Gisekia.*

Linn. Syst. *Pentandria Pentagynia.*

Suffructicose, diffuse annual; leaves opposite, spathulate, oblong or elliptical, lanceolate, entire; flowers greenish, sessile and pedicelled; cymes dense; carpels 5; covered with papillæ sepals, $\frac{1}{16}$ in.

Punjab, Sind, Deccan, and Afghanistan.

Orygia decumbens, *Forsk. Fl. Æg. Arab.* 103; *DC. Prod. iii.* 455; *Hk. Fl. Br. Ind. ii.* 661. *Trailing Orygia.*

Linn. Syst. *Pentandria Pentagynia.*

A glabrous herb; leaves opposite, alternate, fleshy, entire, obovate, cuspidate, ¾-1 in., stipules 0; petioles ⅛ in.; cymes terminal, leaf-opposite, lax, few-flowered; flowers ⅓ in. diam., pedicelled; sepals 5, nearly free, ovate, purplish green, with scarious edges; capsule ⅓ in. diam.; seeds black.

Sind, and Punjab, and from Mysore to Coimbatore.

N. O. 201. TETRAGONIACEÆ,—*AIZOONS.* Lind.—Bal. 101.

Trianthema intermedia, *Stocks.*

Linn. Syst. *Pentandria Monogynia.*

The herb.

Vernacular—Wah, Waho, *Sind*; Marmay, *Punj.*

A spreading, prostrate plant; leaves opposite, broad, lanceolate, wrinkled; flowers in the fork of the branchlets; tetrandrous, pentandrous.

Common in Bengal, Punjab, and Sind, up to the borders of the Beloochistan Hills. This is enumerated in Dr. Stocks' notes (*Sind Selections*) as one of the camel fodder plants of Sind, also as an abortifacient and vesicant. The seeds are said to be eaten by the hill tribes when other grains are scarce.

Trianthema obcordata, *Roxb. Fl. Ind. ii.* 445. *T. monogynia, Linn.*; *Mant.* 69; *Hk. Fl. Br. Ind. ii.* 660.

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Shwet-sabanee, *Beng.*; Nasurgangi, *Dec.*; Wurmah, *Dec.*; Bishkapra, *Punj.*; Narmah, *Sind.*

Stems prostrate, slightly tomentose; leaves opposite, petioled, alternately larger and obcordate, smaller and oblong; flowers solitary, sessile; stems 15–20; style single; capsule many-seeded; seeds reniform.

A common weed on waste ground in the plains of the Punjab and Sind, plentiful among rubbish. Eaten as a potherb in times of scarcity, but apt to produce diarrhœa and paralysis. The plant is officinal, being considered astringent in abdominal diseases; and is also stated to be used to produce abortion.—(*Dr. Stewart.*) *Trianthema micrantha* (Stocks), *Fysur-lanee* (Sind) is a camel fodder plant.

Trianthema pentandra, *Linn.*; *Mant.* 79; *DC. Prod. iii.* 352; *Hk. Fl. Br. Ind. ii.* 660. *Five-stamened Trianthema.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Bishkapra, Narma, *Sind.*

Annual; glabrous; leaves 1–1½ in., oblong or elliptic; flowers sessile, clustered; calyx-lobes ovate, margins often scarious; stamens 5; beak of the fruit mitriform.

Sind, Punjab, and N. W. India. Common throughout the plains.

Trianthema crystallina, *Vahl*; *Roxb. Fl. Ind. ii.* 444. *Papillose Trianthema.*

Perennial; glabrous; stems filiform, prostrate, dotted with crystalline specks; leaves opposite, broad-lanceolate, shortly petioled; flowers densely clustered, solitary in the axils of the branchlets; calyx-lobes triangular, cuspidate.

Sind, Punjab, and N. W. Provinces on the plains.

Trianthema hydaspica, *Edgew. Journ. Linn. Socy.*; *Hk. Fl. Br. Ind. ii.* 661.

A glabrous annual; stems papillose; leaves oblong or elliptic; flowers solitary in sessile clusters; calyx-tube 10-ribbed; stamens 5–7; beak of the fruit truncate, solid, cylindrical.

Sind, Punjab, and Concan. Is said to be eaten as a potherb.

Sesuvium portulacustrum, *Linn.*; *Roxb. Fl. Ind. ii.* 509; *Dalz. and Gibs. Bom. Fl.* 15; *Hk. Fl. Br. Ind. ii.* 609. *Purslane-leaved Sesuvium.*

Linn. Syst. *Icosandria Digynia.*

Suffructicose, diffuse, succulent annual; leaves opposite, fleshy, ½–2 in., obovate to linear spathulate, or subcylindric, petioled; flowers solitary, axillary, pedicelled; calyx-tube short, lobes 5, persistent, colored; capsule ⅓ in., ovate-oblong, membraneous.

Common on the sandhills along the sea shores of Sind, and India generally. Cultivated in some parts of Asia as a substitute for spinage.

Aizoon canariense, *Linn.*; *Boiss. Fl. Orient. ii.* 765; *DC. Prod. iii.* 453.
Purslane-leaved Aizoon.

Linn. Syst. *Icosandria Di-pentagynia.*

A procumbent annual; leaves alternate, 1–1½ in., papillose, tomentose, elliptic or cuneiform ovate, petioled; flowers sessile, axillary, solitary; capsule woody, surrounded by the persistent calyx, ⅜ in. broad, sessile.

Common in Sind and Beloochistan, also on the Mekran Coast and Afghanistan. The ashes of the plant abound in soda.

ALLIANCE 41. *DAPHNALES.*

N. O. 203. THYMELACEÆ,—*DAPHNADS.* Lind.—Bal. 185.

Daphne Mezereum, *W. Mezereon Daphne.*

Linn. Syst. *Octandria Monogynia.*

The bark and root.

Vernacular—Maziryoon, Mushtroo, *Pers.*; Ishkes, *Arab.*

A small shrub, with lanceolate leaves, tapering below, smooth and evergreen. A native of the hilly parts of Europe, from Italy to the Arctic regions, extending to Siberia. Common in the Punjab and Himalayas; and cultivated in gardens as an ornamental shrub. It is supposed to be included with *Daphne Oleoides* under the χαμελαια of Dioscorides. To the early botanists it was known as *Daphnoides Chamæla, Thymelæ,* or *Chamædaphne.* All parts of the plant, especially the bark, are employed in medicine, and possess excessive acridity, acting as a local irritant poison. Applied to the skin it is a vesicant, and in France it is employed for the purpose under the name of *Garou.* Taken internally, according to the enquiries of several physicians, it is said to promote the action of the secreting organs, particularly of the kidneys and skin. In venereal diseases and rheumatic affections it is supposed to be an alterative and sudorific, and is also considered diaphoretic and diuretic; but in the present day it is seldom used in European practice, except as an ingredient in the compound decoction of Sarsaparilla. As a remedy for toothache it is extolled in India, a small piece chewed being often sufficient to relieve the pain. Mezereum, according to analysis, contains sugar, wax, coloring matter and a neutral principle (Daphnine) with an acrid resin.—(*Lind., Royle, Pharm., Edin. Disp.*)

Daphne mucronata, *Royle. Ill. t.* 81; *Brandis For. Flo.* 384.
Mucronate or Olive-leaved Spurge-Laurel.

Linn. Syst. *Octandria Monogynia.*

Vernacular—Pech, *Sind*; Zhikak, Mashur, Shalangree, *Punj.*; Laghoon, *Afg.*

An evergreen shrub; branchlets and leaves softly pubescent; leaves coriaceous, lanceolate, ob-lanceolate, or linear-lanceolate, 1–2 in. subsessile; midrib prominent, with indistinct reticulate veins; flowers white, with a pink tinge, bisexual, and in terminal heads, scented.

Sind, Afghanistan, Persia, Beloochistan, on the eastern flanks of the Suliman range, and the Himalayas. The wood is used to make charcoal for the manufacture of gunpowder. The bark and leaves are used medicinally by natives in cutaneous affections, and the berries are eaten, but are said to cause nausea. A spirit is distilled from them on the Sutledge. In Nepaul and Kamaon paper used for important records is made from the inner fibrous bark.—(*Lindley, Loudon, Dr. Stewart, Brandis For. Fl.*)

N. O. 205. LAURACEÆ,—*LAURELS.* Lind.—Bal. 178.

Cinnamomum zeylanicum, *Nees*; *Laurus cinnamomum. W. Cinnamon Laurel.*

Linn. Syst. *Enneandria Monogynia.*

The bark.

Vernacular—Dalcheenee, *Hind., Dec.*; Darchinee, *Pers.*

This is a small evergreen tree, seldom rising above 15 feet; indigenous in the Troglodyte country, and cultivated extensively in Ceylon, Malabar, Cochin-China, Sumatra and Java. It is also cultivated in Brazil, the Mauritius, in several parts of India, Jamaica, China, and Peru. It is the Κινναμωμον of Herodotus, Dioscorides, Theophrastus and other Greek authors. The name seems derived from the Cingalese Caccynama (*dulce lignum*) or the Malay Kaimanis, which Marshall (a staff-surgeon at Ceylon, to whom we are indebted for the most correct information concerning the plant) says, is sometimes pronounced *Kainamanis.* (*V. Antiq. of Hind. Med.* pages 84 and 141.) The pleasant aromatic and pungent bark (cinnamon) was held in high esteem in the most remote times, and appears, according to Dr. Vincent, to have been the first spice sought after in all Oriental voyages. Cinnamon and Cassia are both mentioned with other odoriferous substances in Prov. vii. 17, again in Cant iv. 14, while in Rev. xviii. 13 they are mentioned among the merchandise of Babylon. Theophrastus, Strabo, Galen, Dioscorides and Pliny, and other writers of antiquity, also mention them in their writings; and, from the accounts which have come down to us, there appears reason to believe that the spices referred to were nearly identical with those of the present day.

The best cinnamon is produced in Ceylon, and, according to Marshall, it is chiefly procured between Negombo and Matura. Beyond these limits the bark is never of good quality; it has little taste, and is greatly deficient of the characteristic spicy aromatic flavor. Even between these limits cinnamon is not of the same quality; exposure, soil, shade and other circumstances have a powerful effect in producing a corresponding variety in the excellence or defects of the produce. The color of that which is considered in Ceylon as of the best quality, is a light yellow, approaching nearly to that of Venician gold, thin, smooth, and shining. By distillation with water it yields a quantity of a pungent and fragrant oil which is of a golden yellow, having a Sp. gr. of 1·035. It is a very powerful stimulant, and is often effectually used in cramps of the stomach, tooth-ache, and paralysis of the tongue. The bark (cinnamon) contains sugar, mannite, starch, mucilage, and tannic acid. Like other aromatics the effects of cinnamon are stimulating, heating, stomachic, carminative and tonic; but it is used as an adjunct to other remedies, rather than as a remedy itself. As a spice it is largely consumed.—(*Royle, Loudon, Ainslie, Pharm., Pharm. of Ind., Birdwood, Kitto, Bib. Cycl., Edin. Disp.*)

Cinnamomum albiflora, *Nees.*

Linn. Syst. *Enneandria Monogynia.*

The leaves.

Vernacular—Tej-pat, Tamalpathra or Kummalpathra.

This tree, besides growing in Khasya, is found in Nepaul and in the Punjab, is not uncommon in the Himalaya, east of the Sutlej, grows sparingly at about 5,000 ft. as far as the Ravi, and probably in Hazara. It is supposed to be the plant which furnished the *Folia Malabathri* or Tamalpathra of old pharmacologists, which, with the bark, was held in considerable repute. The former constitutes the *Tejpat* or *Tuj* of the Indian Mat. Medica, and partakes of the aroma and pungency of the bark. It is employed in rheumatism in the Punjab, being considered stimulant. It is also used in flatulent colic, diarrhœa and other diseases arising from a disordered state of the bowels. The bark is a pleasant aromatic stimulant and carminative, closely allied in medical properties to cloves, for which it may be substituted. It forms an agreeable adjunct to many other medicines.—(*Pharm. of Ind., Dr. Stewart.*)

Laurus camphora, *W*; *Camphora officinarum. Linn.* *Camphor Tree.*

Linn. Syst. *Enneandria Monogynia.*

The solid volatile oil of the wood.

Vernacular—Kaphoor, Kafur, *Hind.*

This is a native of China and Japan. It is likewise plentiful in the island of Formosa, where it covers the whole line of mountains from north to south, up to an elevation of 2,000 feet above sea level. In China it abounds principally in the eastern and central provinces. The whole tree has an odour of camphor, and from the roots, leaves and bark camphor is obtained by distillation. From the wood of *Dryobalanops camphora* (Colebrook), a forest tree of Borneo and Sumatra, is also obtained camphor in crystalline fragments. It is stated that the price of this article is very exorbitant, although it possesses exactly the same properties as that of the officinal camphor. Camphor exists also in other plants as *Blumea.* Medicinally, camphor is used with any bland oil as an application in rheumatism, lumbago, glandular swellings, and muscular pains, in asthma with assafœtida, in headaches with acetic acid. In spermatorrhœa it is a very useful medicine, and in almost all affections of the uterus affords much relief.—(*Pharm. of Ind., Ainslie, Pharm.*)

Tetranthera Roxburghii, *W.*

Linn. Syst. *Enneandria Monogynia.*

The bark.

Vernacular—Maida-lukkri, *Hind.*; Kutmur, Kukooree, *Beng.*; Harean, Medasak, *Punj.*

This tree is found in the Punjab Sewalick tract, and although it grows in the salt range to 2,500 feet, Dr. Stewart says he has not seen it so far west as *T. monopetala.* The bark being considered stimulant after being bruised, is applied fresh or dry to contusions, and is sometimes mixed with milk, and made into a plaster. The bark of *T. monopetala* is mildly astringent, and has a considerable degree of balsamic sweetness. It is used by the people of Coromandel and the Sircars in the cure of diarrhœa. The fruit yields a greasy exudation from which candles are manufactured by the Chinese.—(*Dr. Stewart, Ainslie.*)

N. O. 206. CASSYTHACEÆ,—*DODDER LAURELS.* Lind.—Bal. 178.

Cassytha filiformis, *Linn.*

Linn. Syst. *Enneandria Monogynia.*

The plant.

Vernacular—Akaswail, *Hind.*

Cassytha is the Greek name of the *cuscuta,* which this plant much resembles in habit and characters of analogy. *C. filiformis* is a parasite found in long festoons growing over trees, and said by Ainslie to be used by the Brahmins of Southern India for seasoning butter-milk. In the Punjab a similar parasite is noticed by Dr. Stewart as *Cuscuta reflexa* under the same synonyme (*Akasbel*), which is common in the plains, generally on *Zizyphus* or *Adhatoda vasica,* and less often on *Dalbergia, Populus euphratica* and *Ficus caricoides.* In the hills it appears to grow to 9,000 feet on *Spiræa, Sambacus, Indigofera, Carduus, Salvia* and *Nepeta,* &c. The flowers have a pleasant and powerful scent. In various parts the seeds are boiled and put on the stomach as a carminative, and bruised, for washing the head; or bruised and burned, as an anodyne. They are also officinal as *Akasbel* or *Aftimoon,* given in cold infusion as a depurative, and constitute part at least of the *Kasus* of drugsellers given as a purgative and cholagogue.—(*Loudon, Dr. Birdwood, Dr. Stewart.*)

ALLIANCE 42. *ROSALES.*

N. O. 209. FABACEÆ,—*LEGUMINOUS PLANTS.* Lind.—Bal. 74.

Crotalaria Burhia, *Ham.*; *Dalz. and Gibs. Bom. Fl.* 54; *Hk. Fl. Br. Ind. ii.* 66.

Linn. Syst. *Diadelphia Decandria.*

The plant.

Vernacular—Khip, Khep, Sissai, Bhata, Booi, *Punjab*; Lathia Kharsan, *Hind.*; Drunnoo, *Sind.*

A sub-herbaceous procumbent annual; with slender, flexible, tomentose branches; leaves pale green, alternate, deciduous, subsessile, oblong, hairy; flowers small, yellow, in terminal racemes, on short pedicels; legumes turgid, inflated, stalked, villous, 2-valved, 1–3 seeded.

Common in Sind, Beloochistan, Afghanistan, and in all the more arid parts of the Punjab from Delhi to Trans-Indus up to Peshawur; and cultivated in the most northern provinces of India. It has a very tough bark, and when bruised, has exactly the smell of *broom*; from which circumstance, probably, it has received the name of "*Booi*," smell or fragrance. Both in Sind and the Punjab ropes are made from its fibres, and from those of *C. juncea*, Linn., *C. retusa*, Linn., and *C. tenuifolia*. *C. juncea* and *retusa* yield the "Sunn" of commerce. The fibres of all these and several other species of *Crotalaria* are employed in the manufacture of cordage, coarse gunny cloths, and canvas. Dr. Stewart presumes *C. Burhia* has some coagulant power; as a bunch of it is sometimes used to stir milk. The branches and leaves are in the East used as a cooling medicine.—(*Brandis For. Flo., Dr. Stewart, Royle's Fib. Pl.*)

Lotononis Leobordea, *Benth. Hook. Lind. Journ. ii.* 607. *Hk. Fl. Br. Ind. ii.* 64.

A suffructicose, diffuse annual; leaves digitately trifoliate; leaflets somewhat fleshy, oblanceolate, deciduous; stipules minute, connate, minutely mucronate; flowers 1–5, pale yellow, subsessile, axillary; calyx silky, sub-equally 5-toothed; pod linear, turgid; anthers dimorphous.

Sind, Punjab, and at Quetta in Beloochistan.

Trifolium resupinatum, *Linn.* *Resupinate Trefoil.*

Cultivated in Sind, Punjab and Afghanistan.

Melilotus parviflora, *Desf.*; *DC. Prod. ii.* 187. *Trifolium indicum, Linn.*; *Roxb. Fl. Ind. iii.* 388. *Short-flowered Melilot.*

Linn. Syst. *Diadelphia Decandria.*

The seed.

Vernacular—Sinjee, *Punj.*; Zir, *Sind.*

This plant is a native of various parts of India, appearing during the dry season until March. It occurs wild with *M. leucantha* in the plains and hills of the Punjab; and is perhaps the Melilot mentioned by Thompson as found by him at 13,000 feet in Zanskar. In Sind it is occasionally grown in small patches after the Indian corn crop as fodder for cattle. Cows fed on it, are said to yield an abundance of milk. In

the Punjab it is cultivated for the same purpose. The seeds are said to be useful in bowel complaints and infantile diarrhœa, given as a gruel. The seeds and flowers of *M. officinalis*, W. (*Zireer*, Pers., *Aspruk*, Hind.) and the common melilot, a European species, cultivated in India, are the chief ingredients in flavoring the Gruyere cheese, being bruised and mixed with the curd before it is pressed. The flavor is due entirely to a peculiar principle (*coumarin*), which exists abundantly in the flowers. It is said to possess styptic properties, and to have relieved cases of bloody urine caused by inward contusions. It is also employed in the preparation of an oily remedy for bruises.—(*Lindley, Loudon, Dr. Stewart, Select Papers Agri-Horti. Socy., Punjab Report, Roxb.*)

Trigonella fœnumgræcum, *Linn.*; *Roxb. Fl. Ind. iii.* 389. *Common Fennugreek.*

Linn. Syst. *Diadelphia Decandria.*

The seed.

Vernacular—Mathee, Meetha, *Dec.*; Samleet, Khoulbee, *Hind.*

A native of South Europe, cultivated as a potherb throughout India. The seeds are used in dysenteric affections and coughs; and are given as a gruel to nurses to produce a flow of milk. Given to cows they have the contrary effect. They have rather an unpleasant odour, with an unctuous, farinaceous taste, accompanied with a degree of bitterness.—(*Dr. Stewart, Ainslie, Lindley.*)

Trigonella occulta, *Delile*; *DC. Prod. ii.* 185; *Boiss. Fl. Orient. ii.* 84; *Hk. Fl. Br. Ind. ii.* 87.

A densely cæspitose, glabrous annual; with slender stems; leaves pinnately 3-foliolate, toothed; stipules laciniated; flowers 2–4 in. sessile, in axillary clusters; lemon yellow; pod short, elliptical, turgid, 2-seeded.

Sind, Punjab, and N. W. Provinces. The seeds are used in dysenteric affections, and the fresh gathered plant and pods as a potherb.

Trigonella polycerata, *Linn.*; *DC. Prod. ii.* 184; *Hk. Fl. Br. Ind. ii.* 87.

Like the last, but more slender; stipules not laciniated; pod small, not beaked; flowers 2–4, sessile, axillary; pod 1–2 in. long, falcate.

Sind, Punjab, and N. W. Provinces.

Medicago sativa, *Linn.*; *Wall. Cat.* 5945. *Lucerne.*

Linn. Syst. *Diadelphia Decandria.*

Vernacular—Vilaithee-gawuth, *Hind.*; Rishka, Dureshta, *Afg.*; Hol, *Lad.*

This is a deep-rooting perennial, sending up numerous small and tall clover-like shoots, with blue or violet flowers. It is the μηδική of the Greeks and *Medica* of the Romans; and is said to have been introduced into Europe during the wars with Darius In Persia it is much grown, and is mown in all the year round. In the N. W. Himalayas it is found wild from 5,000 to 12,000 feet, and is extensively cultivated in Afghanistan and Ladak, and in all other parts of India, as fodder for horses, &c., especially in large military stations. Its nutritious qualities, easy cultivation, and rapid growth have placed it in the first rank of vegetable food for cattle, even at the present time. According to an old writer, there is no other pulse or grass so agreeable or precious for feeding beasts as lucerne; not only for nourishing and fattening, but as a physic also. In Kanawar, according to Captain Hutton (*Select Pap. A.-H. Socy., Punjab*

Rep.) a yellow flowering lucerne grows well on the higher tracts around Hungo and Chango in Hungrung. The nutritive product of lucerne, according to Sir H. Davy, is 2–3 tenths per cent. and is to that of the clovers and santfoin, as 23 to 39. This result does not, however, agree with the superior nutritive powers attributed to lucerne. —(*Loudon, Dr. Stewart, Birdwood, Select Pap. A.-H. Socy., Punj. Rep.*)

Medicago denticulata, *Willd.*; *DC. Prod. ii.* 176; *Hk. Fl. Br. Ind. ii.* 90; *M. polymorpha, Roxb. Fl. Ind. iii.* 390. *Serrate-leaved Lucerne.*

Annual; stems glabrous; leaflets $\frac{1}{2}$–$\frac{3}{4}$ in., oblong, cuneate-obovate, faintly toothed; peduncles short, 2–6 flowered, not awned; stipules laciniated; pod spiral, subglobose, muricated.

Sind, Punjab, and N. W. Provinces.

Ononis Aucherii, *Jaub. and Spauch. Ill. l. Orient.* 96; *Lotus Stocksii. Boiss. Fl. Orient. ii.* 174; *L. Garcini. Hk. Fl. Br. Ind. ii.* 91.

A stiff-branched, suffructicose annual; leaflets 3, all sessile, pale fleshy, obovate, cuneate; flowers sessile, axillary, solitary, inconspicuous; calyx densely downy, $\frac{1}{4}$ in.; pod linear, straight, 5–6 seeded.

Sind and the Punjab in sandy soil.

Cyamopsis psoralioides. *DC. Prod. ii.* 216; *D. fabæformis Roxb. Fl. Ind. iii.* 316.

Linn. Syst. *Diadelphia Decandria.*

Vernacular—Gowarphullee, Gowaree, *Hind., Dec., Guz.*

Widely cultivated throughout India for its young and tender legumes, which are used as a vegetable by all classes. The plant is pulled up and sold as fodder for cattle. A wild variety is extremely common in Kurrachee among hedges.

Indigofera tinctoria, *Linn.*; *DC. Prod. ii.* 224; *Roxb. Fl. Ind. iii.* 379. *East Indian Indigo.*

Linn. Syst. *Diadelphia Decandria.*

The prepared juice—Indigo.

Vernacular—Nir, Neel, *Hind.*; Gooli, *Guz.*; Jil, Nil, *Punj, Sind.*

An erect, pubescent shrub, 2–3 feet high; branches covered with a soft silky down; leaves pinnate, 4–5 pairs, oblong, ovate; racemes axillary, shorter than the leaves, sessile, many-flowered; pedicels shorter than the calyx; calyx 5 cleft; legumes reflexed, 1–2 inches long, nearly straight, about 10-seeded.

There are several species of this genus which afford the indigo dye in India, the West Indies, and America. Good indigo is also obtained from species of *Marsdenia, Galega, Isatis,* and other plants, but in India it is chiefly taken from the several species of *Indigofera*. In Sind from *I. pauciflora* and *cordifolia*; but *I. tinctoria*, from which the best quality is obtained, is the species chiefly cultivated throughout India. Dr. Stewart (*Punj. Pl.*) says it is not very commonly cultivated in the Punjab, and that the chief tracts for its cultivation are in the Southern Punjab near Mooltan, &c., about Hansi, and in portions of the upper parts of the Jullundur and Bari Doabs. In his notes on articles of cultivation suitable to Sind, Dr. Stocks states that if European method and intelligence were brought to bear upon the culture, instead of leaving it, as now, to native enterprise, the result would be as it was half a century ago in Bengal, where it is, at the present day, under culture to a greater extent than in other parts of India. It appears pretty certain that the culture of the

indigo plant and the preparation of the drug have been practised in India from a very remote epoch. It has been questioned indeed whether the *indicum* mentioned by Pliny (*Hist. Nat.* Lib. xxxv. C. 6) was indigo, but, as it would seem, without any good reason. Pliny states that it was brought from India; that when diluted it produced an admirable mixture of blue and purple colors, (in diluendo misturam purpuræ cæruleique mirabilim reddit); and he gives tests by which the genuine drug might be discriminated with sufficient precision. It is true that Pliny is eggregiously mistaken as to the mode in which the drug was produced; but there are many examples in modern as well as ancient times, to prove that the possession of an article brought from a distance implies no accurate knowledge of its *nature* or of the processes followed in its manufacture. Beckman and Dr. Bancroft have each investigated this subject with great learning and sagacity; and agree in the conclusion that the *Indicum* of Pliny was real indigo, and not, as has been supposed, a drug prepared from the *Isatis* or *Woad*. At all events there can be no question that indigo was imported into modern Europe by way of Alexandria, previously to the discovery of the route to India *viâ* the Cape of Good Hope. It is worth remark however that indigo did not make its way into general use without much opposition. The coloring matter is most abundant when the flower blossoms are expanding, and occurs in nearly the whole plant, but chiefly in the leaves. Two methods are followed in preparing the dye, viz., *fermentation* and *maceration*; and both are in favor in India. The indigo of commerce occurs in powder or in cubic cakes of a deep blue approaching to black, which acquires a copper tint and lustre on being rubbed. It is brittle and friable; and, if pure, tasteless and inodorous, insoluble in water, and very slightly soluble in alcohol. By boiling with dilute sulphuric acid a viscous matter is separated. Dilute alkaline solutions remove from it a brown coloring matter, and boiling alcohol a red one. With regard to the medicinal uses of the plant under notice, Ainslie states that the root is reckoned among those medicines which have the power of counteracting poisons, and that the leaf has virtues of an alterative nature, and is given in hepatitis, in the form of powder, mixed with honey. The root is also given in decoction in calculus; and, used as a lotion, effectually destroys vermin. The juice of the young branches mixed with honey is recommended for apthæ of the mouth or thrush in children. The leaves rubbed in water and applied to the abdomen are efficacious in promoting urine. Powdered indigo has been employed in epilepsy and erysipelas, and, sprinkled on foul ulcers, is said to cleanse them. In Sind an infusion of the leaves and root of *I. pauciflora* is given for scorpion and snake bites, and is said to be efficacious in the latter. As a gargle in mercurial salivation a decoction of the stem is recommended.—(*Lindley, Loudon, McCulloch's Com. Dict., Ency. Arts and Sciences, Brandis For. Flo., Ency. Brit., Drury, Stocks, Ainslie, Dr. Stewart, Birdwood, Cleghorn Punj. Rept.*)

Indigofera trigonelloides, *Jaub. and Spauch*; *Hk. Fl. Br. Ind. ii.* 94. *Trigonella-like Indigo.*

Linn. Syst. *Diadelphia Decandria.*

A cæspitose trailing, densely silvery and much-branched plant; leaves petioled, 5–7 foliolate, ½–1 in. long.; leaflets firm, alternate, oblong-lanceolate; stipules linear; calyx teeth setaceous; flowers 10–20, sessile, in heads, red; pods long, ¼ in., cylindrical, hoary, torulose.

Sind, Beloochistan in the Bolan, and Afghanistan.

Indigofera pentaphylla, *Linn.*; *DC. Prod. ii.* 230. *Hk. Fl. Br. Ind.* 95; *I. fragrans, Roxb. Fl. Ind. iii.* 375. *Five-leaved Indigo.*

Linn. Syst. *Diadelphia Decandria.*

Like the last: leaves short-petioled, odd pinnate; leaflets 5, obovate, opposite, membraneous, glaucous below, with a few adpressed hairs; racemes 2–4, flowered; flowers bright red.

Plains of Sind, Punjab, and Kutch.

Indigofera paucifolia, *Delile*; *DC. Prod ii.* 224; *I. argentia, Roxb. Fl. Ind. iii.* 374. *Few-leaved Indigo.*

Shrub, 4–6 feet high, with woody branches; leaves subcoriaceous, argenteo-canescent; leaflets 3–5, alternate, oblong-lanceolate, ½–1 in., sometimes solitary on the branches; racemes short peduncled, 20–50 flowered, corolla red; pod glaucous, 6–8 seeded, torulose, recurved.

The plains of Sind, Punjab, Concan, Kutch, and Beloochistan.

Indigofera parviflora, *Delile*; *W. and A. Prod.* 201; *Hk. Fl. Br. Ind. ii.* 98. *Small-flowered Indigo.*

Sub-erect, thinly argenteo-canescent, herbaceous shrub, 1–2 feet high; leaves short-petioled; leaflets membraneous, 7–9 linear or oblanceolate, opposite; racemes sessile, 6–12 flowered; flowers small; pod 15–20 seeded, long, glabrescent.

Sind, Kutch, Guzerat, and the Concan.

Indigofera trijuga, *Forsk.*; *DC. Prod. ii.* 230; *Hk. Fl. Br. Ind. ii.* 98.

Linn. Syst. *Diadelphia Decandria.*

A suffructicose low shrub, densely argenteo-canescent; leaves less than 1 in. long; leaflets 5–9 obtuse, opposite, small; racemes 6–12 flowered, short peduncled; calyx canescent; flowers thinly silvery; pod turgid, linear, straight, 4–6 seeded.

The plains of Sind.—(*Stocks.*)

Indigofera argentea, *Linn.*; *DC. Prod. ii.* 224; *Boiss, Fl. Orient ii.* 190; *Hk. Fl. Br. Ind. ii.* 98. *Silvery-leaved Indigo.*

Linn. Syst. *Diadelphia Decandria.*

A suffructicose, woody branched shrub, densely argenteo-canescent; leaves 1–2 in. long.; leaflets opposite, ½–1 in. long.; subcoriaceous, persistently argenteous, obovate, petioled; stipules minute, setaceous; racemes subsessile, 12–20 flowered; flowers reddish yellow; pod glabrescent, reflexed, 3–4 seeded, turgid, canescent, torulose.

Common on the Sind plains, and in Kutch with the next.

Indigofera anabaptista, *Steud*; *Hk. Fl. Br. Ind. ii.* 100.

Linn. Syst. *Diadelphia Decandria.*

Annual, diffuse; stems covered with adpressed hairs; leaves short-petioled; leaflets 3–7, opposite, oblanceolate; racemes short peduncled, 12–20 flowered; calyx argenteo-canescent, ⅛ in.; pod linear, reflexed, 6–8 seeded.

Sind, Kutch, Punjab, Beloochistan, and Afghanistan.

Glycyrrhiza glabra, *Linn.* *The Liquorice Plant.*

Linn. Syst. *Diadelphia Decandria.*

The root—Liquorice root and extract.

Vernacular—Jaytimud, *Hind.*, *Sind.*

A plant which, under several varieties, as *G. typica, echinata,* &c. is found in parts of Europe, Asia Minor, Persia, and Afghanistan, and also cultivated rather extensively for its root, known as liquorice root, the medicinal properties of which depend on a saccharine matter and mucus extracted by digestion in water and forming an extract. (Extractum Glycyrrhiza of the Pharmacopœia) A decoction of the root with other mucilaginous vegetable substances is often prescribed in catarrh and phthisical cases, also in dysuria and ardor urinæ, with beneficial effect—also in cases of dyspepsia, but its chief use is in coughs and catarrhal affections and in pharmaceutical preparations.

Tephrosia tenuis, *Wall. Cat.* 5970; *Dalz. and Gibs. Bom. Fl.* 61; *Hk. Fl. Br. India ii.* 111. *Slender Tephrosia.*

Linn. Syst. *Diadelphia Decandria.*

Annual; stems filiform, densely cæspitose; leaves simple, nearly sessile, linear, 1-2 in. long, glabrous above, obscure silky beneath; stipules minute, setaceous; flowers in leaf-opposed racemes, 1–2 together; pedicels filiform; calyx-teeth lanceolate; pod 6–10 seeded, linear $\frac{1}{2}$–1 in. long, pubescent, dehiscent.

Common in Sind, Kutch, the Punjab, and the Concan. Twigs used as a tooth-brush by natives.

Tephrosia purpurea, *Pers.*; *DC. Prod. ii.* 251; *Galega purpurea, Linn*; *Roxb. Fl. Ind. iii.* 386; *Hk. Fl. Br. Ind. ii.* 113. *Purple Tephrosia.*

Vernacular—Surpunka, *Sind, Punj.*; Bun-nil, Bansa, *Punj.*

A shrubby sub-erect perennial, with glabrescent or finely downy stems; leaves short-petioled, 3–6 in. long; leaflets green, obtuse, glabrescent above, obscurely silky beneath; stipules filiform, reflexed; racemes elongated, terminal, leaf-opposed, 3–6 in. long; flowers red, in fascicles, pedicelled; bracts subulate, 3-flowered; pod glabrescent, recurved, 6–10 seeded.

Sind, Punjab, N. W. Provinces, Kutch, Rajputana, and nearly throughout India on sandy plains. Several varieties are known. The twigs are used for making baskets, and the plant is officinal, according to Dr. Stewart (*Punjab Plants*), being considered depurative and cordial. In some places an infusion of the seeds is considered cooling. The root is bitter, and given by native practitioners in dysentery and chronic diarrhœa. —(*O'Shaughnessy* p. 292.)

Tephrosia pauciflora, *Grah. in Wall. Cat.* 5635; *Hk. Fl. Br. Ind. ii.* 114. *Few-flowered Tephrosia.*

Herbaceous annual; stems densely cæspitose; leaves glabrescent above, silky pubescent below; leaflets narrow-oblanceolate, also silky pubescent below; stipules setaceous; flowers on short pedicels in the axils of leaves; racemes sparse; pod 1–2 in. long, glabrescent.

Common in Sind and the Punjab.

Sesbania Ægyptiaca, *Pers.*; *DC. Prod. ii.* 254. *Egyptian Sesbania.*

Linn. Syst. *Diadelphia Decandria.*

Vernacular—Jayntee, *Hind.*

Cultivated in Sind and throughout India nearly.

Agati grandiflora, *Rheede i. t.* 51; *W. and A. Prod. i.* 225. *Large-flowered Agati.*

Linn. Syst. *Diadelphia Decandria.*

The bark.

Vernacular—Agust, Agusta, *Hind.*; Agati, *Sans.*

This tree grows usually from 20 to 25 feet in height, unarmed and arboreous. Leaflets in 10 pairs; peduncles 2–3 flowered, pendulous; calyx campanulate, two-lipped; racemes axillary; legumes pendulous, above a foot in length, linear; upper margin broad and channelled, many-seeded.

Indigenous in North Australia and the Indian Archipelago. Planted, it may be seen in Sind and throughout India, especially in the vicinity of villages. In Travancore, Bengal, and other places where the *Piper betel* is cultivated, it is used as a support for training the plant, and as shelter from the sun. The young leaves and tender pods are very much relished by the natives, who use them as a vegetable. The bark is powerfully bitter and tonic, and an infusion of the leaves, according to Dr Busteed (*Pharm. of Ind.*), is a useful cathartic. For dimness of sight the juice of the flowers squeezed into the eyes is said to produce remarkably good effects. Of this plant there are two varieties, *Albiflora* and *Coccinea*—the white and red flowered. The red variety is called *Bansa agusta* and the white *Sufaid agusta.*—(*Roxb., Flo. Ind., Brandis For. Flo., Lindley, Pharm. of Ind.*)

Caragana ulicina, *Stocks*; *Hook. Journ. Bot. iv.* 1852; *Brandis For. Fl.* 134; *C. pygmæa*? *Hk. Fl. Br. Ind. ii.* 116. *Siberian Pea-tree.*

Linn. Syst. *Diadelphia Decandria.*

Vernacular—Shinalak, *Sind.*

A thorny shrub, 2–3 feet high; leaves fasciculate in the axils of stout trifid spines; leaflets 2–3 pair, abruptly pinnated, silky, ovate, sharp-pointed; petioles spiny, persistent; flowers yellow or reddish yellow, solitary; pedicels jointed; calyx sub-campanulate; legumes cylindrical, pubescent.

Common in the hills of Beloochistan, ascending to 6,000 feet (Shahbilawl) near Kurrachee, Waziristan 2,000–8,000 feet. The flowers are eaten by the Brahois in Beloochistan. Seems to be only a variety of *C. ambigua*, which is said to differ in having larger flowers, and pods slightly curved at the top. Various spinous, yellow-flowered species abound in the Thibetan parts of the Himalaya, &c., where they are browsed by sheep.—(*Brandis For. Flo., Select Papers Agri-Hort. Socy. Punjab.*)

Astragalus hamosus, *Linn.*; *DC. Prod. ii.* 290; *Boiss. Fl. Orient. Hk. Fl. Br. Ind. ii.* 122. *Hook-podded Milk Vetch.*

Linn. Syst. *Diadelphia Decandria.*

Vernacular—Ukleel-ul-moolk, *Hind., Sind, Punjab.*

A procumbent annual; leaves $\frac{1}{4}$–$\frac{1}{2}$ in. long., petioled; leaflets pale green, obcordate, villous, distinctly stalked, glabrescent above, silvery pubescent below; flowers pale yellow, in dense heads, peduncled; pod long, cylindrical, glabrous, recurved.

Found sparingly in Sind above Schwan, and in the Beloochistan hills. Also occasionally in the central Punjab, where the pods are officinal, being ground to mix in plasters. In Khagan two species (*A. spinosus* and *A. multiceps*) are abundant, and several others in the Thibetan Himalayas, but none of these yield Tragacanth, the source of which is certain plants indigenous in Asia Minor, Greece, Armenia, Khoordistan and Persia, viz.: *A. verus, A creticus, A. cristatus, A. gummifera, A. strobiliferus, A. adscendeus, A. brachycalyx*, and probably a few others. Arabian authors describe it by the name of *Kuseera* or *Kutira*, which in all the presidencies in India is the synonym (Kuteera) for the gum of *Cochlospermum gossypium*, known as the false Tragacanth of commerce. *Astragalus* tragacanth usually occurs in broad shell-like plates of a white or yellowish color, tough and elastic, but rendered more pulverizable by a heat of 120° Fahr. It is very sparingly soluble in cold water, but swells into a gelatinous mass, which is tinged violet by tincture of iodine. It possesses emollient and demulcent properties. In irritation of the mucuous membranes, and especially the pulmonary and genito-urinary organs, it proves useful. Its chief use, however, is as a vehicle for more active medicines.—(*Brandis For. Flo., Roxb., Lindley, Bird., Sel. Pap. Agri-Hor. Socy. Punj., Royle, Dr. Stewart, Pharm. of Ind.*)

Astragalus prolixus, *Sieb. Pl. Ægypt.*; *A. arabicus, Ehrenb.*; *Hk. Fl. Br. Ind. ii.* 121.

Linn. Syst. *Diadelphia Decandria.*

Annual; covered with basifixed hairs; stems slender, densely clothed with adpressed white hairs; leaves petioled, $\frac{1}{2}$–$1\frac{1}{2}$ in. long; leaflets distant, glaucous, 11–17, oblong-obtuse, pubescent, with adpressed hairs; stipules minute, lanceolate; flowers small, yellow, in dense heads, peduncled; pod sessile, short, straight, linear oblong.

Occurs on the plains of Sind and the Punjab.

Astragalus contortuplicatus, *Linn. DC. Prod ii.* 290; *Boiss. Fl. Orient. ii.* 230; *Hk. Fl. Br. Ind. ii.* 122. *Wave-podded Milk Vetch.*

Linn Syst. *Diadelphia Decandria*

A sub-erect annual; stems densely clothed with pubescence; leaves petioled, 3–4 in. long; leaflets obovate, emarginate, greenish, densely pilose on both sides; stipules lanceolate; flowers yellow, in dense heads, short-peduncled; pod $\frac{1}{2}$ in. long, cylindrical, downy, recurved, 20–30 seeded.

Plains of Sind and the Punjab.

Astragalus sub-umbellatus, *Klotsch.*; *Hk. Fl. Br. Ind. ii.* 119.

Linn. Syst. *Diadelphia Decandria.*

A diffuse annual, clothed with white hairs; leaves 1–2 in.; leaflets 13–21, oblong, glaucous, densely pilose; flowers yellowish purple, peduncled, 6–10; bracts setaceous; pod $\frac{3}{4}$ in., sessile, cylindrical, 20–24 seeded, recurved, pubescent.

Sind, Punjab, Beloochistan (in the Bolan), and Afghanistan.

Cicer arietinum, *Linn.*; *DC. Prod. ii.* 354; *Roxb. Fl. Ind. iii.* 324. *Common Chick Pea or Gram.*

Vernacular—Chunna, *Hind.*; Chenna, *Dec.*; Chahna, *Sind*; Chola, *Punjab*; Nakhud, *Pers.*; Humz, *Arab.*

The Ἔρεβινθος of Hippocrates and Theophrastus and ετερον ειδος ερεβινθον of Dioscorides.

This much-prized pulse is widely cultivated all over India, and in some parts constitutes the staple food of the inhabitants. It is everywhere the chief food for horses. Among the poorer classes of natives parched gram is much eaten, and often suffices at a pinch for their daily sustenance. It is a favourite pulse with the native vegetarians, who eat it boiled, in the form of ragout, seasoned with a little pepper or capsicum. Masson states that made into bread, it is sweet, and was a favorite of the Sikh Sirdars. It is still frequently eaten thus in parts of the Punjab. The flour is used by the natives in the Deccan and on the Malabar Coast for washing the hair and body, and often, with soapnut, for washing silks. The young plants (*Arburrah, Dec*) with the tender seeds are sold and eaten throughout the Deccan, Madras and Guzerat, either raw, or roasted in hot ashes. From the hairs of the stem, leaves and other parts of the plant exudes an acid liquid, containing oxalic, acetic, and perhaps malic acids; and according to Dispan, another acid peculiar to the plant (Watt's *Chem. Dict.*). This acid is collected by placing muslin cloths on the plants, which during the night, becoming wet with the heavy dew, are imbued with it. The cloth is then wrung, and the liquor collected for use by the natives in lieu of vinegar, and as a refrigerant drink in fevers. In dysmenorrhœa the stem of the plant is said to be useful. Notices of this acid, its uses, and mode of collection, &c. are given by Dr. Christie (*Med. Lit. Scient. Journal*) and Dr. Heyne (*Tract* p. 28). From another species (*Cicer soongaricum*), a plant somewhat similar to the one under notice, which grows wild on the upper Sutledge and Chenab, and is indigenous in all the mountains in Lahoul, Spiti, and Kanawur, a similar acid is collected by the inhabitants, and used as vinegar. The seeds are also eaten and given to cattle. The composition of the seeds of *Cicer arietinum* is moisture 10·80 per cent., fatty matter 4·56 per cent., nitrogenous matter 19·32 per cent., mineral constituent ash 3·12 per cent., and starchy matter 62·20 per cent.—(*Birdwood, Graham, Dr. Stewart, Ainslie, Pharm. of Ind., Sel. Papers Agri-Hort. Socy. Punj.*)

Pisum sativum, *Linn.*; *DC. Prod. iii.* 342. *Common Pea.*

Vernacular—Burra-muttur, *Hind.*, *Beng.*; Bahtahna, Wattahna, *Hind.*; Harainso, *Sans.*

The most valuable of culinary legumes. Like most domestic plants of great antiquity, its native country is unknown. Loureiro states that it is a native of China and Cochin-China, and Ainslie believes it is indigenous in Central India. It is cultivated throughout the plains in India, but in the North-west Himalaya, up to 14,000 feet, it does not ripen its seeds. Pea straw, cut green and dried, is reckoned as nourishing as hay; and is considered excellent fodder for goats and sheep. A thousand parts of pea flour afforded Sir H. Davy 574 parts of nutritive or soluble matter, viz. 501 of mucilage or vegetable animal matter, 22 of sugar, 35 of gluten, and 16 of extract, or matter, rendered insoluble during the operation.—(*Birdwood, Ainslie, Loudon, Dr. Stewart.*)

Ervum lens, *Linn.*; *Roxb. Fl. Ind. iii.* 324. *Lentil Tare.*

Vernacular—Mussoor, *Sans.*, *Hind.*, *Dec.*; Mahasoorce, *Punj.*, *Sind*; Addas, *Egypt.*

This is a legume of the greatest antiquity and much prized in all Eastern countries. In Egypt and Syria the lentil is parched and eaten, and is considered the best food for those who undertake long journeys. In India it is used by the natives in the form of ragout, seasoned with cummin seed, capsicum and saffron. It is the pulse principally used as a compound in the preparation of their favourite dish "khichrî," and is considered the most nutritious of the pulses; but is said to be heat-

ing, and apt to cause eruptions if too freely indulged in. It is the flour of this pulse and its varieties that constitutes the "Revalenta Arabica food," so largely advertised, and which has obtained a wide celebrity for its valuable effects as "a delicious food, superseding all medicine." Bread, composed of lentil and barley flour, Sonnini in his *Travels* assures us, is eaten in Southern Egypt by the poorer classes; and in Palestine forms the chief food of the laboring population. From 3,840 parts of lentil Einhoff obtained 1,260 parts of starch and 1,433 of a matter analogous to animal matter. Dr. Playfair from 100 parts obtained 33 of albumen, 8 gluten, and 48 of starch, &c.; while an equal quantity of peas and beans contained 29 and 31 respectively of albumen. The above is said to be the proportion of nutritive matter in all the varieties of lentils, three of which are cultivated in Germany and France. In India *Ervum hirsutum* is the only variety under the same synonymes, and is found in the Sutlej Valley growing in cornfields, and is used as fodder.—(*Loudon, Birdwood, Dr. Stewart, Cleghorn, Punj. Rept., Ency. Bibl. Lit., Hassal's Food and its Adulterations.*)

Vicia faba, *Linn*; *Roxb. Fl. Ind. iii.* 323; *Faba vulgaris, Mœuch.* *Garden Bean.*

Vernacular—Ful, *Egypt.*; Bakla, *Punj., Hind.*; Chastang Raioon, *N. W. Himalaya.*

It is inferred that this pulse is the Bean of Pythagoras, usually referred to *Nelumbium speciosum.* It is a well-known legume, cultivated in the Southern and Western Presidencies, not grown in the plains of the Punjab, except by Europeans, but commonly cultivated in Kashmere, 5,000 feet, and Kanawur, Spiti, and Thibet, 8,000 to 12,000 feet, and in parts of Sind, as a vegetable. The beans are ground into flour for food, and are on the Sutlej given to cattle (Hugel), but it is said to have bad effects on horses if not given with other grain. The flour is more nutritious than that of oats, but less easy of digestion. A thousand parts of bean flour were found by Sir H. Davy to yield 570 parts of nutritive matter, of which 426 were mucilage or starch, 103 gluten, and 41 extract or matter rendered insoluble during the process.—(*Birdwood, Lindley, Loudon, Dr. Stewart, Roxb.*)

Lathyrus sativus, *Linn.*; *Roxb. Fl. Ind. iii.* 321. *Chickling Vetch.*

Vernacular—Kisaree, Kussoor, *Hind., Beng.*; Mattar, *Sind*; Masang, *Pers.*; Gilban, *Egypt.*; Lang, *Guz.*

Cultivated throughout the Southern and Western Presidencies and Sind, often in the plains of the Punjab, as a cold weather field crop for its pulse, and grows up to 12,000 feet in Thibet. Edgeworth states that he never saw it cultivated, though it was common as a weed in fields with pulse and cereals. It is also common as a weed in parts of the Himalaya up to 9,500 feet. In several parts of the Continent and throughout India bread is made from the flour of this pulse, but it produces paralysis of the lower extremities, and on this account its use was forbidden in the last century by an edict of George, Duke of Wurtemberg, and further enforced by his successor, Leopold. Dr. Stewart says he never heard of its producing paralysis in the Punjab, as it is said to do at times in the N. W. Provinces; but Thomson suggests it may have had something to do with a paralysed village he visited at an elevation of 11,000 feet in Thibet. In one district in Bengal nearly 4 per cent. of the population were sufferers from paralysis. Such are the effects of this grain, that swine fed with the meal lose the use of their limbs, but grow fat. Horses are similarly affected. Mixed with wheat flour it loses all its bad effects, and makes a light wholesome bread.—(*Lindley, Roxb., Pharm., Graham, Dr. Stewart, Loudon.*)

Lathyrus inconspicuous, *Linn.*; *DC. Prod. ii.* 372; *Hk. Fl. Br. Ind. ii.* 180.

Copiously branched, slender stemmed annual, leaflets 1-2 in. narrow; stipules linear; petiole short, not winged; flowers lilac, solitary, subsessile in the axils of the leaves; pods linear, many-seeded.

Not uncommon in Sind, and perhaps in the Punjab also.

Arachis hypogea, *Linn.* *American Earth Nut.*

Vernacular—Moongphullee, Boeemoong, *Hind.*; Vilaitee-moong, Boee-moong, *Dec.*; Boochanaka, *Sans.*

Cultivated in all tropical and sub-tropical countries. In the Southern and Western Presidencies, the Concans, Guzerat, and Khandeish it is cultivated to a large extent for its seeds; and in Bengal to a small extent. It is the *οὔγγον* of Theophrastus and *ἀράχιδνα*, according to Fraas. Its specific name, *Hypogea*, is in allusion to the curious circumstance of the pods, as they increase in size, forcing themselves into the earth. The manner in which the young minute germs of the plant acquire pedicels sufficiently long to allow them to thrust themselves into the ground to the depth of one, two, or even three inches, where they grow and ripen their seed, is truly wonderful. To understand this admirable economy, it must be observed that the flowers are most perfectly sessile, two, three, or four in the axils of the leaves, and that the germ is lodged in the very base of the tube of the calyx. Soon after the flower decays, the germ acquires pedicels, after which it lengthens fast and enters the earth; and, when the legume is perfectly formed, it will generally be found as deep in the earth as when full grown, from which it may be conceived that it buries itself to its greatest depth before the seeds begin to enlarge, and while the germ is only an obtuse point. The nuts are eaten boiled or toasted by all classes of natives throughout India, and also sugared as comfits; and in cakes made of jaggery, called *goordhanee*. In Sind, on account of the dearness of almonds, they are substituted for them in making the sweetmeat called "Hulwah." The seeds yield by pressure from 42 to 50 per cent. of a fat oil, which is almost colorless, of an agreeable faint odour, and a bland taste resembling that of olive oil, for which it is often substituted in pharmacy; an inferior oil is obtained by warming the seeds before pressing them. The best oil has a specific gravity of about 0·918, becomes turbid at 3°, concretes at 3° to 4°, and hardens at 7°, and consists of oleic, hypogœic, palmitic and arachic acids. It is used for burning in lamps, for lubricating purposes, and in the manufacture of soap. In preparing their curries, or frying sweet cakes, &c., natives use it instead of clarified butter (ghee), and prefer it to gingelly oil, provided it is obtained fresh. As to its use in this way and in pharmacy, Dr. Winchester, late Medical Storekeeper, in reporting on the oil prepared at the Government Gardens, Hewrah, in the Deccan, states: "It is used in Western India instead of olive oil. It is of a pale straw color without smell, and so pure in taste that fish can be cooked with it, and rendered quite as agreeable to the palate as with ghee or clarified butter," and adds that it was accepted by the whole Medical Department as a complete substitute for olive oil.—(*Lindley, Birdwood, Loudon, Roxb., Pharm., Pharm. of Ind.*)

Æschynomene indica, *Linn.*; *DC. Prod. ii.* 320; *Roxb. Fl. Ind. iii.* 343; *Hk. Fl. Br. Ind. ii.* 151.

A suffructicose annual, 1–3 feet high, glabrous, with slender short branches; leaflets 20–50 pair linear, oblong, smooth, 1-nerved, with reddish margins; leaves alternate, pinnate, 2–6 in. long; stipules lanceolate, deciduous; racemes axillary and terminal, 1–4 flowered; flowers yellowish; peduncle and pedicels viscid; calyx and corolla glabrous; pod 1–1½ in. long, straight or curved, broad, of one-seeded joints.

Common in Sind, Punjab, Bengal, and the Deccan.

Æschynomene aspera, *Linn.*; *DC. Prod. ii.* 320; *Roxb. Fl. Ind. iii.* 365; *Hk. Fl. Br. Ind. ii.* 152.

A floating perennial; stems full of pith, glabrous; stipules linear or lanceolate, deciduous; leaflets 61–101 linear, obtuse, 1-nerved; racemes corymbose, 2–4 flowered; pedicels and peduncles clothed with bristles; pod 2–2¼ in.; joints 3–6.

Sind, Bengal, and throughout the Tropics.

Alhagi maurorum, *Desv.*; *DC. Prod. iii.* 352. *Camel Thorn, or Prickly-stemmed Hedysarum.*

The plant and manna.

Vernacular—Oosturkhar, Jawash, Khari-jar, Kas-kundero, *Sind*; Shinz-koobee, *Brahoe*; Zoz, Shootarkar, *Pers.*; the Manna; Turrunj-been.

A small shrub, with numerous axillary spreading spines; leaves simple, lanceolate, mucronate, short-petioled; stipules ensiform; flowers purple, pedicelled; legumes an inch long, sickle-shaped or straight; calyx 5-fid.

Indigenous in Syria, Mesopotamia, Egypt, Punjab, Beloochistan, and Sind; extending east as far as Monghyr on the Ganges, and south to the Southern Mahratta Country, also in the Concan and Guzerat. It is the "*Occhus*" of Pliny and the *ακανθα εν Αρια* of Theophrastus, and Sprengel would believe it also to be the thorn of Proverbs xxiv. 31. It is the *Shootur-khar* of the Persians, and is the only food of the camels in the deserts of Arabia, Africa, and Persia. As fodder in Sind and the Punjab it is relished by camels more than any other plant. Cows and goats, the deer and ibex, also enjoy it. Such is the importance of this food for camels, that the Afghans, who call it *khari shootur* or *jaursa*, believe that the serious loss of these animals experienced in the Afghan operations was due to its absence. Besides its utility as fodder, it is of much service in Guzerat, Sind, and the Southern Punjab as a substitute for "*kuskus*" (*Anatherium muricatum*) in making door screens or tatties in the hot season. From the stems of the plant a secretion called *Turunj-beer*, a kind of manna, is collected, which some writers are of opinion is that on which the Israelites were fed in the wilderness; and it is remarkable that this secretion is not obtained from the plant anywhere out of Persia and Bokhara; the climate of these places only being suited for its production. Kandahar and Herat are mentioned by Griffith, Bellew, and Irvine, as the places where it is most collected after the spring rains. It occurs in the form of little round brown granular tears, varying from the size of mustard to that of hemp seed, mixed with the leaflets and stocks of the plant and other impurities, having an agreeable saccharine taste. According to Ludwig it contains crystalline grains of cane sugar, some dextrin, a sweetish mucilaginous substance, and a very little starch. It is employed in native medical practice as a laxative for children, and in advanced pregnancy.—(*Brandis, Roxb., Birdwood, Pharm., Pharm. of India, Dr. Stewart, Lindley, Edin. Disp.*)

Taverniera nummularia, *DC. Prod. ii.* 339; *Dalz. and Gibs. Bom. Fl.* 67; *Hk. Fl. Br. Ind. ii.* 140. *Round-leaved Taverniera.*

A suffructicose undershrub 1–2 ft. high; branches slender, terete, finely canescent; leaves simple, 3-foliolate, shortly petioled; leaflets variable in size, nearly round, thick, pale-green, thinly canescent beneath; stipules lanceolate, scarious; flowers red, glabrous, in lax racemes; calyx thinly silky; calyx tube turbinate; pod jointed, 1–4, roundish, indehiscent.

Common on the plains of Sind and the Punjab, also in Afghanistan.

The leaves of this plant are said to be useful in the form of a poultice as an application to sloughing ulcers, as keeping them clean.

Hedysarum latebrosum, *DC.*; *W. and A. Prod.*; *Heylandia latebrosa, Hk. Fl. Br. Ind. ii.* 65.

A prostrate annual; leaves alternate, close-set, simple, subsessile, cordate-ovate; flowers yellow, subsessile, solitary in the axils of leaves; pods silky, $\frac{1}{6}$ to $\frac{1}{4}$ in. long, flat, oblong, 1–2 seeded.

Sind, Punjab, Kutch, and the Gangetic Plain to Ceylon.

Canavalia gladiata, *W.*; *Roxb. Fl. Ind. iii.* 300. *Sabre-podded Canavalia.*

Linn Syst. *Diadelphia Decandria.*

Vernacular—Mekkhun, *Beng.*; Shim, Burra Shim, Kudsumber Abye, *Hind.*, *Dec.*

A twining perennial, with ovate-cordate, acute, glabrous leaflets; stipules linear, deciduous; legumes gladiate; seeds arilled, red, white, or gray.

There are three or four varieties of this plant cultivated in India for their legumes, which are much esteemed as a vegetable. In Sind they are not as large as those grown in the Deccan and Bengal, where they are generally from 1½ to 2 feet in length.

Mucuna pruriens, *DC. Prod. ii.* 405. *Indian Cowhage.*

Linn. Syst. *Diadelphia Decandria.*

The pod.

Vernacular—Kopicachoo, *Sans.*; Kuyach, *Hind.*; Kachkooree, *Dec.*; Gunchgajee Konchkaree, *Punj.*; Kawitch, *Sind.*

A large climbing, twining, perennial, with pendulous racemes; legumes in shape like the italic letter *f*, about 4 inches long, covered with stinging hairs.

Indigenous throughout India and the West Indies. The *Cacara pruritus* of Rumphius. Its pods when young and tender form an article of diet in India; and the strigose hairs are used as a mechanical anthelmintic for the expulsion of long and round worms, administered in the form of electuary with honey or treacle; and at one time these were used by superstitious natives for poisoning wells of water.

Its employment as a vermifuge originated in the West Indies, and was not known in the East till the latter part of the last century; when it also attracted attention in England, being strongly recommended by Bancroft in his *Natural History of Guiana* (1769) and by Chamberlain, a Surgeon of London, who published an essay descriptive of its effects. It was introduced into the *Edinburgh Pharmacopœia* of 1809. In the present day it is seldom prescribed in European practice. The root of the plant sweetened with honey is prescribed by native practitioners in cholera morbus, and the seed is said to absorb scorpion poison, when placed on the part stung.—(*Rox.*, *Ainslie*, *Pharm.*, *Pharm. of India*, *Royle.*)

Butea frondosa, *W.* *Downy-branch Butea.*

Linn. Syst. *Diadelphia Decandria.*

The seeds, flowers and gum. The gum-kino, "Kummurrus."

Vernacular—Palasa, *Beng.*; Kinsuka, *Sans.*; Chachra, *Punj.*; Pullas, *Dec.*; Dhak, Palasa, *Hind.*; Kakria, *Guz.*

This is a small tree, but when looked after, attains a considerable size, reaching a height of 40 feet, with a girth of 10 to 12 feet. It flowers in March and April in large axillary and terminal racemes, closely clustered, of a beautiful deep red, shaded with orange; common throughout India and Burma. Is common to the south-east of Umballa, and more rarely to the west, except in patches or over somewhat isolated tracts in the Jullundur and Bari Doabs, &c. The Jhelum river is its north-western limit. Ascends to 3,000 feet, occasionally to 4,000 feet in the N. W. Himalaya, often gregarious. Common also in the Concans and Deccan, Khandeish and Guzerat, and is one of the few trees which thrive in black soil and the saline earth of the Punjab. Grown in gardens in Sind. Dr. Roxburgh in his account of the plant in the *Asiat. Res.* vol. 3, and in his *Flora Indica*, p. 540, states that "from natural fissures and wounds

made in the bark of this tree during the hot season, there issues a most beautiful red juice, which soon hardens into a ruby-colored brittle astringent gum, but it soon loses its beautiful color if exposed to the air. To preserve the color it must be gathered as soon as it becomes hard, and kept closely corked in a bottle. This gum, held in the flame of a candle, swells and burns away slowly, without smell or the least flame, into a coal, and then into fine light white ash : held in the mouth it soon dissolves ; it tastes strongly, but is simply astringent ; heat does not soften it, but rather renders it more brittle ; pure water dissolves it perfectly ; the solution is of a deep red color ; it is in a great measure soluble in spirits, but this solution is paler, and a little turbid ; the watery solution also becomes turbid when spirit is added, and the spirituous solution becomes more clear by the addition of water ; diluted vitriolic acid renders both solutions turbid. Mild, caustic, and vegetable alkali change the color of the watery solution to a clear deep fiery red : the spirituous solution they also deepen, but in a less degree. *Sal martis* changes the watery solution into a good durable ink."

This gum was at one time supposed to be the genuine kino of commerce. It is no doubt possessed of similar properties and is frequently used as such throughout India, and is useful like it in diarrhœas and advanced stages of dysentery. It is also employed to clarify the indigo dye. Analysed by Mr. E. Solly, a portion in the crude state yielded about 50 per cent. of tannin ; but when the impurities were removed, 100 parts contained 73·26 parts of tannin, 5·05 of difficultly soluble extractive, and 21·67 of gum with gallic acid and other soluble substances. The color and properties of tannin vary with the exposure and season of collection.

Dr. Roxburgh says that "infusions of the flowers, either fresh or dried, dyed cotton cloth, previously impregnated with a solution of alum or alum and tartar, of a most beautiful bright yellow, which was more or less deep according to the strength of the infusion. A little alkali, added to the infusion, changes it to a deep reddish orange ; it then dyed unprepared cotton cloth of the same color, which the least acid changes to a yellow or lemon : these beautiful colors I have not been able to render perfectly permanent.

"Amongst numberless experiments I expressed a quantity of the juice of the fresh flowers, which was diluted with alum water, and rendered perfectly clear by depuration, it was then evaporated by the heat of the sun into a soft extract ; this proves a brighter water-color than any gamboge I have met with ; it is one year since I first used it, and it remains bright.

"Infusions of the dried flowers yielded me an extract very little, if anything, inferior to the last mentioned ; they yield also a very fine durable yellow lake, and all these in a very large proportion."

The flowers are used in preparing the "Holee" powder, *goolall*, and as a poultice in orchitis, &c., in Yunani medicine. According to Bellew, they are given in decoction to pregnant women in cases of diarrhœa, and to sheep for hæmaturia on the doctrine of signatures, and are applied to bruises and sprains.

The seeds of this tree enjoy a repute as a vermifuge, especially amongst the Mahomedan doctors. As met with in the bazaars, they occur in the form of thin, flat, oval or reniform seeds of a mahogany brown, $1\frac{1}{4}$ to $1\frac{3}{4}$ inches in length, and almost devoid of taste and smell. The late Dr. Butler (*Mad. Med. Rep.*, 1855, p. 425) reported very favorably of their efficacy in this respect, and his views are confirmed by other reports from medical officers who have given them a trial. Dr. Oswald, who has had considerable experience in their use, directs the seeds to be first soaked in water, the testa to be carefully removed, and the kernel to be dried and reduced to powder. Of this the dose is 20 grains three times a day, for three successive days, and a dose of castor oil on the fourth day. Thus administered, Dr. Oswald states that he has seen it cause the expulsion of 125 lumbrici in one instance, and 70 to 80 in another. The remedy has the advantage of occasionally purging when its anthelmintic properties are not apparent. Dr. Kees mentions that in large doses it is apt to induce vomiting ; and Dr. G. Smith adds that it is apt to irritate the kidneys. These ill effects justify a caution given by Dr. Pulney Andy as to its indiscriminate use. The powdered seeds, made into a paste, have in some instances, according to Dr. Oswald, been found useful in ringworm. According to Dr. Sherwood, a decoction of the seed, to which a little nitre has been added, has been known to be prescribed with advantage in gravelly complaints.

From the root bark a kind of rope is occasionally made; it is also said to be employed for matches, and to be useful for the same purposes as oakum, by Jameson, who correctly notes that Griffith must be mistaken in the remark that paper is made from the tree. The bark is used in dyeing blue and in tanning.—(*Lindley, Brandis, Roxb., Asiat. Res. vol.* 3, *Pharm., Pharm. of India, Royle, Ainslie, Dr. Gibson in Graham's Cat, Cleghorn Punj. Rept., Dr. Stewart, Select Papers Agri-Hort.-Socy. Punj.*)

Phaseolus aconitifolius, *W. and A. Prod.* 247. *Aconite-leaved Kidney Bean.*

Linn. Syst. *Diadelphia Decandria.*

Vernacular—Bassunta, *Sans.*; Addas, *Pers.*; Mote, Mut, *Hind., Dec.*; Mohr, *Sind*; Mut, *Guz.*

A diffuse annual cultivated generally in light unirrigated soils in Sind, Punjab, the Deccan, and Concan, Khandeish, and Guzerat, and in the Madras and Bengal Presidencies, for its pulse, which is very pleasant tasted. In the Punjab the pulse is not much valued, and is thought to be heating. The uncommon luxuriance of this plant gives reason to think it will yield a much larger crop of fodder than most others. In 100 parts of the pulse there were moisture 11·22, nitrogenous matter 0·64, and mineral constituents 3·56.—(*Dr. Stewart, Graham, Roxb., Ainslie, Punj. Rept.*)

Phaseolus max, *Roxb. Fl. Ind. iii.* 293. *Hairy-podded Kidney Bean.*

Vernacular—Kalamoong, *Beng.*; Kala Oord, *Dec.*; Mash, *Arab.*; Benoo Mash, *Pers.*; Oordh, *Sind.*

A sub-erect annual, every part hairy; legumes also. A variety of *P. mungo*, widely cultivated in India for its pulse, which is not unlike *P. mungo*, except in color and size. In the Sutlej Valley between Rampur and Sungnam, at an elevation of 6,000 feet.—(*Roxb., Punj. Rep., Birdwood.*)

Phaseolus mungo, *Linn.*; *Roxb. Fl. Ind. iii.* 297.

Vernacular—Hurree Moong, Oorud, *Hind.*; Kheerdya, *Beng.*; Moong, *Sind*; Oorud, *Dec.* and *Guz.*

A sub-erect ramous hairy plant. The green gram of Bengal, the black and green gram, according to variety, of Bombay. A very useful and pleasant tasted pulse, of much use when famine is imminent. It contains in 100 parts 9·20 of moisture, 24·70 nitrogenous matter, 60·36 starchy matter, 1·48 fatty matter, and mineral constituents 3·26. There are several species of this cultivated throughout India as food: the (*Phaseolus alatus*) winged kidney bean, called *Burbuttee*, Hind.; (2 *P. lunatus*, W.) the scimitar-podded kidney bean of Ceylon, where it is called *Ooru dambala*; and 3 *P. trorsus*, the *Seetamars* of the Newars, cultivated in Nepal, also *P. Aureus* or *Soona-moong* and *P. Calcaratus* or *Ranga-moong*—the first being cultivated in Bengal, and the second in Mysore.—(*Roxb., Birdwood, Lindley, Ainslie, Eng. Cyc.*)

Phaseolus radiatus, *Roxb. Fl. Ind. iii.* 320. *Rayed Kidney Bean.*

Vernacular—Hurita, Masha, *Sans.*; Tircorai-kalai, *Beng.*; Moong, Orud, *Hind.*; Mah, *Sind*; Mag, *Guz.*

A diffuse hairy annual called *Dord* in some provinces in Hindostan. Cultivated all over India and to 5,000 feet in the Punjab hills. Is the most esteemed of all the *Leguminæ*, and bears the highest price. Its pulse is the origin of the weight "Massah" as the seed of *Abrus precatorius* is of the weight "Ruttee." Its roots are narcotic, and so are those of *P. multiflorus*, the scarlet running kidney bean, recorded to have poisoned some children at Chelsea who had partaken of them. The straw of this and its variety *melanospermus* is given to cattle as fodder, and the herb of *P. trilobus* is said to be administered in Behar in decoction, in cases of irregular fever.—(*Roxb., Lindley, Birdwood, Ainslie, Punj. Report.*)

Dolichos sinensis, *Linn.*; *Roxb. Fl. Ind. iii.* 302. *Chinese Dolichos or Asparagus Bean.*

Vernacular—Loobia, *Hind.*; Chawriro, *Sind*; Chowlee, *Dec.*; Loobya, *Pers.*; Chota Hurwan, *Punj.*

This is commonly cultivated as a hot-weather crop in Sind, Punjab, the Himalayas, Deccan, and the Madras and Bengal Presidencies. Its seeds are eaten boiled like peas, also parched and otherwise; and the leaves used as a potherb, but are chiefly given to cattle as fodder. There are two varieties, one with white and the other brown seeds; the first is most esteemed for the table.—(*Graham, Select Papers Agri-Hor. Socy. Punjab, Dr. Stewart, Roxb.*)

Dolichos uniflorus, *W. and A.*; *Dolichos biflorus, Roxb. Fl. Ind. iii.* 302. *Two-flowered Dolichos.*

Vernacular—Koluthoo, *Sans.*; Koolthee, *Hind., Dec., Guz.*; Barat, Botang, Gulattee, *Punj.*; Gagli, *Sutlege.*

An annual, cultivated in the Himalayas up to 7,000 feet, and throughout the Southern and Western Presidencies; requires a dry, light, rich soil. The produce is about 60 fold. It is used everywhere for feeding horses, but requires to be boiled previously, and it is said to fatten them. The natives eat it boiled, and in curries. It contains in 100 parts moisture 11·30, nitrogenous matter 23·47, starchy matter 61·20, fatty matter 0·87, mineral constituents 3·34.—(*Roxb., Dr. Stewart, Ainslie, Graham.*)

Dolichos Lablab, *Linn.*; *Roxb. Fl. Ind. iii.* 305; *Lablab vulgaris, Savi*; *DC. Prod. ii.* 401. *Black-seeded Dolichos.*

Vernacular—Wal-papree, *Hind.*; Wal, *Sind*; Lobiyah, *Pers.*; Liblah, *Egypt.*; Katjang, Kala Lobiyah, *Punj.*

A perennial or annual: leaves pinnately trifoliate; racemes elongated with alternate fascicles of short-pedicelled flowers on glandular knobs; flowers red, white, or purple; legumes compressed, semilunar, scabrous at the back, 3–5 seeded.

Cultivated throughout India. The tender legumes are eaten as a vegetable in curries, &c., by the natives, and the seeds boiled. In the Southern Presidency the seeds are given to cattle. There are as many as 20 varieties of this plant, a few only of which are cultivated. Roxburgh enumerates five, and two as growing wild. The composition of the seeds of the species under notice in 100 parts is nitrogenous matter 10·84, starchy matter 24·55, fatty matter 60·78, mineral constituents 3·03.—(*Roxb. Fl. Ind., Birdwood, Stocks, Dr. Stewart, Eng. Cyc.*)

Rhynchosia memnonia, *DC. Prod.* 386; *Boiss. Fl. Orient. ii.* 625; *Hk. Fl. Br. Ind. ii.* 225.

A suffructicose, pubescent, trailing annual; stems and leaves clothed with minute persistent grey pubescence; leaves pinnately 3-foliolate; leaflets as broad as long, subcoriaceous; stipules minute, lanceolate; racemes 6–12 flowered, pedicelled; pedicels short; flowers yellow; pod glabrescent, turgid, slightly recurved, ½–⅝ inch long.

Common at Kurrachee and Muggur Peer, also in the Hubb.

Pterocarpus marsupium, *W. Emarginate-leaved Pterocarpus.*

Linn. Syst. *Diadelphia Decandria.*

The Gum—Gum kino.

Vernacular—The gum—Kummur-rus, *Hind.*; Peetshola, *Hind.*, *Beng.* The tree—Beubla, Bia, Hoonee, *Dec.*

This is a very handsome tree, 40 to 80 feet high, found widely diffused in Southern India. In Western India it grows luxuriantly, and is common in some parts of the Concans, Rajpeepla Jungles (*Dr. Lush.*). Along the Malabar Coast it is abundant, as also on the Canara Ghauts; and, according to Buchanan, it occurs in Nepaul and to the eastward of Bengal. In Central India it is also frequently seen. It yields the gum kino (*kummur-rus*) of commerce, the introduction of which article as an European medicine is due to Fothergill, an eminent physician and patron of economic botany of the last century, who received it from a druggist as a very fine kind of dragon's blood, and described it as the produce of an African tree called the *Pau de Sangue.* The origin of the name "kino" has not yet been satisfactorily determined; but Dr. Royle states he has "long been of opinion that the name was derived from the Indian *kuenee* or *kini*, applied to a similar exudation from the bark of *Butea frondosa*, of which the Sanscrit name is *kinsuka.*" Dr. Pereira states that what he calls East Indian kino is always regarded in commerce as *genuine gum kino;* and that an experienced broker assured him it was the produce of the Malabar Coast; that it is so is confirmed by Dr. Gibson, who writes that "kino is the produce of *P. marsupium*, a tree very common below the Ghauts," also that "kino is exported in considerable quantities from the Malabar coast." It is a red juice which exudes from the bark of the tree when wounded, and hardens in the open air into angular, brittle, glistening, reddish-black fragments, ruby red on the edges, and affording a light brown powder, not unlike Peruvian bark. It is inodorous, with a bitterish, highly astringent and ultimately sweetish taste. It is not softened by heat. Cold water dissolves it partially, boiling water more largely, and the saturated decoction becomes turbid on cooling and deposits a reddish sediment. Alcohol dissolves the greater portion. According to Vanquelin's analysis it contains no gallic acid, but *tannin* and a *peculiar extractive matter* 75, *red gum* 24, *insoluble matter*, 124. Its aqueous solution is precipitated by gelatine (with which it produces a green color, in consequence of the presence of a little *catuchine*) and by dilute acids, solutions of metallic or earthy salts, or of alkaline chromates. Kino in its general behaviour is closely allied to Pegu catechu, and yields by similar treatment the same products, *i. e.* it affords *Pyrocatechin* when submitted to dry distillation, and *Protocatechuic acid*, together with *Phloroglucin*, when melted with caustic soda or potash.

Its therapeutic uses are similar to those of catechu; but, being milder in its operation, it is better adapted for children and delicate females. In mucuous disorders it has been found very serviceable, and as a topical astringent has been applied to flabby ulcers, and used as a gargle, injection, and wash. It is said to be employed in the manufacture of wines, and might be used, if cheap enough, in tanning and dyeing.

The gums of *Pterocarpus draco* Dumulookwain, *Hind.* and *P. erinacea* are also very astringent, and used for all the above purposes just as is gum kino.—(*Birdwood, Royle, Mat. Med., Pereira Mat. Med., Duncan's Edin Disp., Brandis, O'Shaughnessy, Pharm., Phorm. of Ind., Roxb. Fl. Ind., Ainslie, Graham.*)

Abrus precatorius, *Linn.*; *DC. Prod. ii.* 381; *Roxb. Fl. Ind. iii.* 258.

Jamaica Wild Liquorice or Bead Seed Tree.

Vernacular—Goonj, Goonch, Goochee, Rutti Goonj, Khakshi, *Pers.*; Sweta-koonch, *Beng.*; Ain-ul-duk, *Arab.*

A very common twining plant, with a woody stem and slender herbaceous branches, a native of the West Indies. Common throughout India (in Sind a single plant in the Merewether Garden), ascending in the sub-Himalayan tract to 3,500 feet, flowers at the close of the rains. The roots are used in the West Indies and in India similarly to those of *Glycyrrhiza glabra*, for which it forms an excellent substitute. Its red, and occasionally white, seeds are strung and worn as beads and also as rosaries, hence the specific name *Precatorius.* They are well known in the Western Presidency as a jeweller's weight (ruttee), and are popularly believed to weigh almost uniformly one grain troy;

but Sir Wm. Jones found, from an average of numerous trials, the weight of one to be a grain and five-sixteenths ($1\frac{5}{16}$). Goldsmiths use a fine powder of the seeds to assist in increasing the adhesion of the joints of the delicate portions of jewellery before firing. In native medical practice in Western and Southern India, and in the Punjab, it is used as an application to fistulas. Lunan in his *Hort. Jamaic.* states that the leaves of this plant are sometimes used as tea in Jamaica; and adds that the seeds are of a most deleterious nature, and that Herman is of opinion that three in powder is a mortal dose, although they may be swallowed whole with safety. Linnæus also speaks of their deleterious properties, but these assertions are now disposed of, from the fact that the seeds are eaten in Egypt, although they are the hardest and most indigestible of the pulses.—(*Lindley, Loudon, Ainslie, Dr. Stewart, Brandis, Pharm. of Ind., Graham, Roxb. Fl. Ind.*)

Dalbergia Sissoo, *Roxb.* *The Sissoo Tree.*

Linn. Syst. *Diadelphia Decandria.*

Vernacular—Sissoo, *Hind.*; Talee, *Sind*; Sissoo, Sissai, *Punj.*

A large tree, 40–50 feet high, with a rather crooked trunk 5–8 feet in girth; branches numerous, spreading; leaves pinnate, alternate, petioled, bifarious; leaflets 3–5, alternate, obcordate, acuminate, glabrous, shining, pubescent when young; petioles of old leaves glabrous; flowers small, yellowish white, in axillary panicles; bracts small; calyx campanulate, hirsute; corolla papilionaceous; legumes linear-lanceolate, membraneous, 3-seeded; seeds reniform, compressed.

Indigenous in Upper Sind, Beloochistan, the Kachhi Forest, in the Punjab plains, the Himalaya 2,000 to 4,500 feet, Guzerat, Coromandel Coast, Bengal and Central India.

The timber of this tree is much prized in India for making furniture, &c., on account of its strength and elasticity. The result of four different experiments of the weight of this timber obtained from Larkhana was 43·26 lbs., 47·63 lbs., 45·10 lbs., and 46·5 lbs. per cubic foot. The average may be taken at 47 lbs. Sp. gr. ·752.

Parkinsonia aculeata, *Linn.*; *W. and A. Prod.* 283. *Jerusalem Thorn.*

Vernacular—Vilaytee Babool or Keekur, *Sind.*

A small tree, 10–15 feet high; leaves bipinnate; pinnæ 6–10 in. long, 2–4 on either side, flat, coriaceous with or without leaflets; primary petiole $\frac{1}{2}$ in. long, ending in a sharp spine, and often with lateral stipulary spines; racemes axillary, shorter than the leaves; flowers yellow; pod linear, 3–6 in. long; seeds albuminous.

Naturalised in India Found in Sind, Punjab, Kutch, and Rajpootana. Indigenous in the West Indies. Wood whitish, close-grained.

Guilandina Bonduc, *Linn.*; *DC. Prod. ii.* 480. *Wall. Cat.* 5806. *Cæsalpinia Bonduc, Linn.* *Oval-leaved Nicker Tree.*

Linn. Syst. *Decandria Monogynia.*

The nut, bark, and leaves.

Vernacular—Sagurgota, Kat-kalejoo, Kunga Karounj, *Hind.*; Kirbut, *Sind*; Gacha, *Dec.*; Ukut-Nukut, *Punj.*; Ghee-chakkay, *Tam.*; Akit-makit, *Arab.*

A scandent well-armed shrub; branches downy; leaves abruptly bipinnate, pubescent, 5–8 pair, with 2 short unequal slightly recurved prickles between them; leaflets opposite, 6–10 pair,

ovate; stipules large; racemes axillary, many-flowered, branched below; flowers yellow, spicately racemose; sepals 5, nearly equal; petals 5, sessile; pods 2-valved, ovate, 1–2 seeded, coriaceous, covered with straight prickles; seeds bluish grey, nearly globose, smooth, shining.

Indigenous throughout the Southern and Western Presidencies and Sind, in hedges and jungle tracts. In the Punjab mostly cultivated; but occasionally running wild in hedges and waste places; common in the salt line fence in Hurriana. In Amboyna, Rumphius remarks, it is called "Schit," a name probably derived from the Hebrew "Schaid," which signifies a bramble bush. The bark and seeds are very bitter, but not unpleasant to the taste, and are powerfully tonic. The latter, when powdered small, and mixed with castor oil, form a very valuable external application in hydrocele. In intermittent fevers, especially in those of natives, they have been employed with much success. The seeds are considered anthelmintic, and the root a good tonic in dyspeptic complaints. Rumphius says that the inhabitants of Amboyna are in the habit of eating the seeds, from a notion that they will thereby become hardy and invulnerable in war. They are often strung and worn as beads. The leaves are considered deobstruent and emmenagogue, and to be a valuable discutient fried in castor oil in cases of hernia humoralis. The oil obtained from the seeds has been found useful as an external application in convulsions and palsy.—(*Birdwood, Lindley, Ainslie, Dr. Stewart, Brandis, Roxb., Graham, Pharm. of Ind.*)

Cassia fistula, *Linn.*; *Roxb. Fl. Ind. ii.* 333; *W. and A. Prod.* 285.

Purging Cathartocarpus.

Linn. Syst. *Decandria Monogynia.*

The pulp of the Pod.

Vernacular—Amultas, Khyar, Thumfur, *Hind.*; Bhaya, Bawa, *Dec.*; Sondala, *Beng.*; Chimkaneo, *Sind.*

This is one of the most showy of trees, having something of the foliage of the ash with the inflorescence of the cytisus, hence it is called the Indian Laburnum. It grows from 40 to 50 feet high; leaves alternate, 12–18 inches long; leaflets 4–8 pair, opposite, short-petioled, ovate, smooth on both sides, of a light green color, 2 to 6 inches long and 1 to 3 broad; stipules minute; petioles round, without glands; racemes terminal, pendulous, 1 to 2 feet long, or as long as the leaves; ovary pedicelled, smooth, one-celled, with numerous seeds and without any transverse separations; flowers in large pendulous racemes, large, of a bright yellow, and fragrant, diverging on slender, smooth pedicels; legumes cylindrical, pendulous, 1–2 feet long, an inch or a little more in diameter, smooth, somewhat obtuse, indehiscent, marked externally with three longitudinal bands, divided into numerous cells, each containing 1 smooth, flat or oval seed in a soft, black, sweetish pulp.

A native of India and also of Ceylon. Common on the Ghauts and hilly parts of the Concan, also in the Carnatic, where it is called *Cacay*. In the Siwalick tract up to 4,000 feet, to near the Indus and on the hills near Peshawur it is also common. It is frequently planted in the plains for its handsome yellow flowers. In Sind it is only found planted. It is the *Glukokalamon* (γλυκοκαλαμον) of Myrepsicus, and *Kassia melaina* (Κασσια μελαινα) of Joannes Actuarius, who flourished towards the close of the 13th century. It appears to have been known from very early times. Avicenna speaks of it and Serapio mentions it under the name of *Eiarx amber*. Prosper Alpinus also notices it in his "De plantes Egypti," and at the same time speaks of its sweet-smelling flowers, which were administered in decoction in certain affec-

tions of the stomach. The pulp of the pod of this tree was first used in medicine in England in the time of Turner in 1568, and up to very recently. It is yet prescribed, but only as an ingredient in Confectio Sennæ. Native practitioners throughout India use it as a laxative for children, and for weakly women advanced in pregnancy; and as in European practice, as a purgative. Analysed by Vanquelin, this pulp yielded sugar, gum, extractive jelly, gluten, parenchyma and water. M. Henry states that the sugar possesses the nauseous taste peculiar to the pulp, and he has announced the presence of a principle having many of the properties of tannin. The roots of the tree are considered tonic and antiperiodic; and the bark is used for tanning and dyeing. An exudation from wounds in the bark, which hardens into a gum, and called *Kummurkus*, is used like the gum of *Butea frondosa*.—(*Loudon, Royle, Lindley, Pharm., Pharm. of Ind., Ainslie, Roxb., Graham, Dr. Stewart, Brandis, Cleghorn.*)

Cassia lanceolata, *Forsk.*; *Royle Ill. t.* 37; *Roxb. Fl. Ind. ii.* 346.

Lanceolate Cassia.

Linn. Syst. *Decandria Monogynia.*

The leaves—Senna.

Vernacular—Soonamukki, *Hind., Dec.*

An annual, 2 to 3 feet in height, extremely leafy, and of a most luxuriant inflorescence in the cultivated state; stems erect, round, smooth, and a little flexuose towards the apex; leaves alternate, abruptly pinnate; leaflets 5–8 pair, short-petioled, ovate, acute in the lower, and lanceolate acute in the upper parts of the plant, slightly mucronate, smooth above, rather downy beneath (especially in young leaves); petioles without glands; stipules softly spinescent, semihastate, spreading, minute; racemes axillary and terminal, erect, exceeding the subtending leaf; legumes pendulous, membraneous, flat, but slightly swollen; where the seeds are oblong, sometimes elliptical, the upper margin slightly curved, tapering abruptly towards the base, and rounded at the apex; color brown, 5–8 seeded.

Indigenous in upper Egypt, Nubia and Senaar. Hooker says it has no claim to be considered indigenous in India.

There has been in India some difficulty and confusion respecting the species yielding the commercial varieties of senna, arising, as Dr. Royle says, "partly to all the senna countries not having been thoroughly explored, and species having been formed from imperfect specimens, and others from leaves collected out of different samples of the sennas of commerce." Dr. Royle thinks that the species *Cassia officinalis* may include the varieties *C. elongata*, *C. lanceolata*, and *C. acutifolia*, besides which there are other species, *C. obovata*, *C. ovata* and *C. forskallii*. It is now generally admitted that the commercial article consists chiefly of the leaves of *C. lanceolata* and *C. obovata* with the adulteration of the leaves, flowers, &c., of *Cynanchum Argel*, the proportions being 500 parts of *C. lanceolata*, 300 of *C. obovata*, and 200 *Cynanchum Argel*. When they reach Europe they are still further adulterated by the admixture of the folioles of *Colutea arborescens*, which much resemble the obovate senna, but are perfectly symmetrical, not oblique. The different varieties of senna known in commerce are the Tinnevelly, Alexandrian, Tripoli, Aleppo, Moka, Sennapalthe, and the false or argel; but the greater portion of the drug now used consists of leaves much longer and more acute than those of the lanceolate senna of Egypt, called the East Indian senna, which, according to Lemairé Lisancourt, is the produce of a species indigenous on the west coast of Africa, from the Isle of Gori to Sierra Leone, and over all Senegambia, and grown chiefly in Southern India, which he called *C. elongata*; and which is by far the finest and most highly esteemed. Tripoli senna consists of the leaflets of *C. Æthiopica, ovata* and *obovata*. Alexandrian senna varies much in constitution. When picked according to the directions of the

British Pharmacœpia this is an excellent kind; but that commonly employed is generally composed of the leaflets of *C. lanceolata*, *C. obovata*, *Cynanchum argel* and *Tephrosea apollinea*, and sometimes other extraneous matter, which, with the two last, should be removed prior to use. The leaves of the Argel may be distinguished by being lanceolate, equal sided, thick, leathery, and pale. They operate very dubiously, and occasion griping and nausea. Those of *Tephrosia apollinea* are obovate and downy, and the veins proceed transversely from the midrib to each margin of the leaf.

Senna leaves have been analysed by MM. Lassaigne and Feneulle, yielding mucilage, albumen, chlorophyle, fixed oil, a little volatile oil, yellow coloring matter, malic acid, malate and tartrate of lime, acetate of potass and mineral salts; but the properties are supposed to depend upon *Cathartine*, which is not crystallizable, is deliquescent, has a reddish yellow color, with a peculiar smell and bitter nauseous taste. It is soluble in all proportions in alcohol and water but not in ether.

Senna is a very useful cathartic, operating mildly but effectually; acting chiefly on the small intestines, and producing copious loose evacuations. The popular mode of administration among natives is in infusion, consisting of the petals of roses, pulp of the *Cassia fistula* (amultas), pulp of *Tammarindus indica*, *chebulic myrobalan* (Hurda), raisins and sugar.—(*Loudon, Lindley, Dr. Stewart, Brandis, Duncan, Edin. Disp., Royle, Mat. Med, Roxb., Fl. Ind., Pharm. of India, Garrod Mat. Med.*)

Cassia absus, *Linn.*; *DC. Prod. ii.* 500; *Senna exigua, Roxb. Fl. Ind. iii.* 339. *Four-leaved Cassia.*

Linn. Syst. *Decandria Monogynia.*

The seed.

Vernacular—Chowun, Chaksoo, *Sind, Punjab, Hind.*; Hub-us-soudon, *Ar.*; Chysm, *Egypt.*; Chasmuk, *Persian.*

A small *bi-* or *tri-*ennial shrub; stem, leaves and branches hirsute; leaves in 2 pairs, long petioled, alternate, obovate, obtuse, two subulate glands between the lower pair; leaflets obliquely oval, glabrous, 1–2 in. long; petioles as long as leaflets; racemes narrow, few flowered; flowers yellow, or reddish yellow, small; pedicels short, bracted at the middle; legumes hairy, nearly straight, compressed, 1–1½ in. long, 5–6 seeded.

Indigenous in Sind, Punjab and Egypt, also in Southern and Western India, where the seeds enjoy much repute in ophthalmia, blown in the eye in fine powder.

In an epidemic of this disease, which visited Brussels in 1822, Dr. Harbauer gave a fair trial to this treatment, and the results were on the whole confirmatory of its alleged efficacy. (Graefe and Walther's *Journal*, 1825.) In acute inflammation of the eyes they are also employed, the kernels being ground down in water and introduced under the eyelids. Dr. G. Smith, Superintendent of the Eye Infirmary at Madras, characterises it in his report as a dangerous application in catarrhal ophthalmia and granular lids, adding that its application caused great pain. Being mucilaginous they are often employed with benefit in mucuous disorders.—(*Lindley, Dr. Stewart, Dr. Stocks, Roxb., Royle, O'Shaughnessy, Pharm. of Ind.*)

Cassia auriculata, *Linn.*; *W. and A. Prod.* 290; *Roxb. Fl. Ind. ii.* 349. *Eared Cassia.*

Linn. Syst. *Decandria Monogynia.*

The seed.

Vernacular—Chown, *Sind*; Silputya, *Hind.*; Kurwur, *Hind.*

A common shrub, 4–6 feet high, with rather crooked stem; branches spreading, pubescent; leaves 3–5 inches long, abruptly pinnate; underside finely grey, downy, nearly sessile; leaflets

8–12, paired, oval, entire, obtuse, a little downy, with subulate glands at the base of each pair; stipules large, foliaceous, reniform; racemes terminal, corymbose; flowers large, showy, numerous, bright yellow; calyx 5-leaved; legumes membranoous, linear, waved, 4–5 inches long, glabrous, 10–12 seeded; seeds 3–4, small, flat, heart-shaped, of a shining brown color.

Indigenous in Sind, Kutch, the Punjab, and in South and Central India. In the sterile tracts of the Deccan and Guzerat it is also abundant. This plant is of great importance to the tanner, and to workers in iron; the former using the bark for tanning and dyeing leather, and the latter the root for tempering iron and steel. The branches are largely used by natives as tooth-brushes, and are esteemed preferable to those of any other plant for the purpose. The small flat pleasant-tasted seeds are like the preceding species valued as a local application in purulent ophthalmia, and Dr Kirkpatrick (*Cat. Mysore Drugs*) expresses his opinion that they constitute an undoubtedly useful application in such cases when not severe. In Southern India the native practitioners prescribe them in electuary in cases in which the habit is preternaturally heated or depraved. In some parts of Ceylon the leaves are infused as a substitute for tea. A spirituous liquor is prepared in some parts of India by adding the bruised bark to a solution of molasses, and allowing the mixture to ferment.—(*Ainslie, Roxb., Brandis, Graham, Dr. Stewart, Pharm. of Ind.*)

Cassia obovata, *Colladon.*; *Boiss. Fl. Orient ii.* 631. *Senna obtusa, Roxb. Fl. Ind. ii.* 344. *Obovate-leaved Senna.*

Vernacular—Sunna, *Sind.*

A procumbent perennial; leaflets 3–7 pairs, obovate, obtuse, glabrous; stipules obliquely lanceolate, acuminate, spreading; racemes erect, longer than the subtending leaf; legume oblong, reniform, rounded at the end; valves coriaceous, plaited.

Common in Sind, Salt Range to 2,500 feet, Kutch, Guzerat, and South India.

Cassia holoserica, *Fres.*; *Oliv. Fr. Fl. ii.* 278.

Linn. Syst. *Decandria Monogynia.*

A small diffuse shrub; leaflets 5–8 pair, oblong, velvetty, pubescent above and beneath; stipules subulate, spreading, rigid; racemes erect, shorter than the subtending leaves; pod flat, broadly falcate, oblong, rounded at the extremity.

Occurs commonly in Sind, Beloochistan, Arabia, and Kutch.

Cassia sophera, *Linn*; *DC. Prod. ii.* 492; *W. and A. Prod.* 287. *Round-podded Cassia.*

Linn. Syst. *Decandria Monogynia.*

Vernacular—Kulkashinda, *Hind., Beng.*; Kussoronda, Kussunda, *Punj., Sind.*

An erect annual, much-branched and glabrous; leaflets 6–12 pairs, oblong, lanceolate, acute, smooth, with a single gland near the base of the petiole; racemes terminal, few flowered; flowers small, yellow; legumes linear, turgid, many-seeded.

A native of Southern and Western India, Punjab and Sind. An infusion of the bark is administered in diabetes. The powdered seeds are also similarly used ground, it is applied to eruptions. In Tasmania the natives roast the ripening pods and eat the seeds. The leaves bruised and powdered are efficacious as a remedy in ringworms.—(*Roxb., Dr. Stewart, Ainslie, Graham, Lindley.*)

Pongamia glabra, *P. S.* *Smooth-leaved Pongamia.*

Linn. Syst. *Diadelphia Decandria.*

The seed and oil.

Vernacular—Pongum, *Mal.*; Kurrunj, *Hind.*, *Dec.*; Sookhchein, *Punj.*

A handsome moderate-sized tree, with glabrous leaves unequally pinnated, 12–18 inches long; leaflets 2–3 pair, 3–5 inches long, oval, acuminate, glabrous, shining deep green; racemes axillary, peduncled; peduncles many-flowered, half the length of the leaves; flowers small, a mixture of blue, white and pink; legumes semi-ovate, nearly sessile, thick and somewhat woody, about 2 inches long and an inch broad, with a short, recurved beak.

Common on the Coromandel and Malabar Coasts, Canara, Travancore, Bengal, Burmah, Madras, Ceylon, the Concans and Deccan; occurs in the Siwalick tract up to near the Ravi, and is not uncommonly planted out in the plains, but not growing there to any size. In Sind it is only seen planted in gardens as an avenue bush, growing luxuriantly near watercourses, streams, and in moist localities. From the seeds an oil is obtained by expression, which solidifies at 55° and enjoys much repute as an application in scabies, herpes, and other cutaneous diseases. Dr. Gibson asserts that he knows of no article of the vegetable kingdom possessed of more marked properties in such cases than this. As an embrocation in rheumatism it has also been much praised. Some remarks on the physical characters and properties of this oil are given by Dr. Crosse (*Journal Agri-Hort. Socy. of India* 1858, vol. X, p. 223). It is also used by natives for burning in lamps. Cattle are partial to the leaves, which, it is said, act as a lactagogue on cows. As a manure for sugarcane fields they are much valued. The juice of the fresh root is used by natives in Southern India for the purpose of cleansing foul ulcers and fistulous sores, disposing them to close and heal.—(*Birdwood, Loudon, Roxb. Fl. Ind., Brandis, Cleghorn, Dr. Stewart, Pharm. of Ind., Graham.*)

Tamarindus indica, *W.* *Common Tamarind.*

Linn. Syst. *Monadelphia Triandria.*

The fruit.

Vernacular—Amblee, Imlee, *Hind.*; Tintoree, *Beng.*; Umblee, *Arab.*; Gidamree, *Sind*; Tamar-i-hindee, *Pers.*

A lofty spreading tree, with crooked branches, remarkable for its light foliage; leaves abruptly pinnate, composed of 10 or 15 pairs of opposite subsessile leaflets, ½ an inch in length, narrow, oblong, obtuse, somewhat glabrous and of a lively green color; stipules small, deciduous; racemes terminal and lateral, 10–15 flowered; flowers small, yellow, variegated with red; calyx 4-leaved, cruciate, expanding, bi-dentate, deciduous; legumes pendulous, nearly linear, generally curved, somewhat compressed, having externally a hard brittle scabrous rind, which does not separate into valves, but has under it some woody nervous fibres, and a reddish brown acid pulp; seeds 3–12, shining, angular, flat, covered with a membraneous coat.

A native of Africa, where it grows not only in the upper Nile regions, but also in some of the remotest districts visited by Speke, Grant, Kirk, and Stanley, and as far north as the Zambesi. According to F. Von Müller it occurs also in tropical Australia Cultivated throughout India, Burmah, and the West Indies. In Sind it

is very common; and Dr. Stocks mentions it as growing wild. In the Punjab it is rare, except about Delhi. A few trees are found as far west as the Jhelum, and towards Rajaoree; but the fruit does not ripen east (west, *Brandis*) of Umballa. In Southern, Western and Central India it appears to be self-sown.

It is the *Oxyphoinika* (ὀξυφοινικα) of Theophrastus, according to Sprengel, also of Myrepsicus. First mentioned by the Arabians, Avicenna, Serapion and the younger Mesue, who evidently became acquainted with it from the Hindoos, and called it Tamar-i-hindee, *i. e.* Indian date; and hence the derivation of the generic and English names.

Tamarinds are usually distinguished in commerce as the West Indian and East Indian, owing to the former being preserved in sugar; while the latter, though undergoing the same process on a small scale, in some parts are occasionally salted or generally not preserved at all. They are found in the bazaars in a clammy black mass, consisting of the pulp mixed with the seeds, stringy fibres, and some remains of the outer shell; and notwithstanding their uninviting appearance are used in pharmacy. East Indian tamarind in the raw state is of a reddish brown color, and has a strongly acid, saccharine taste. Preserved in sugar, it becomes brownish or blackish, and has a sweetish subacid taste, and contains less of the remains of the outer shell. Analysed by Vanquelin, it afforded citric acid 9·40, tartaric acid 1·55, malic acid 0·45, bitartrate of potash 3 25, sugar 12·5, gum 4·7, pectin 6·25, fibre 34·35, and water 27·55.

In pharmacy it is considered a mild laxative; and is an ingredient in Confectio Senna. In sore throats it has been found a powerful and beneficial cleanser. In Persia and other parts of India refrigerant drinks are made from it, and throughout India it is used as a necessary ingredient in curries, and is the chief vegetable acid used in the manufacture of the different chutnies. Preserved in sugar with spices, it affords an excellent jelly much relished at table, and of service to persons suffering from fever. The seeds ground into flour and boiled into a gruel are used as an article of food in times of scarcity. Made into a thick paste it promotes suppuration. In indolent boils it is also of benefit, and is used for various other purposes. A decoction of the leaves is frequently employed externally in South India, in cases requiring repellant fomentations, also for preparing collyria. Internally the leaves are supposed, conjoined with other remedies, to possess virtues in jaundice. The gum, in powder, is applied to ulcers.

Tamarinds form a considerable export from the Bombay and Madras Presidencies. In 1869-70, 10,071 cwts. were exported from the latter, and 6,230 cwts. from the former. In 1871-72, to the Persian Gulf and Sind chiefly, were exported 6,286 cwts. from Bombay.—(*Loudon, Birdwood, Brandis, Ainslie, Lindley, Roxb. Fl. Ind., Royle, Mad. Trade and Navigation Reports, Pharm., Pharm. of Ind., Pereira Mat. Med., Duncan's Edin. Disp., Dr. Stewart, Select Papers. A.-H Society Punjab.*)

Inga dulcis, *Willd.*; *W. and A. Prod.* 268; *Manilla Tamarind.*

Vernacular—Vilaytee Imlee, *Hind.*

Cultivated in the Government gardens, Kurrachee.

Bauhinia purpurea, *Linn.*; *Roxb. Fl. Ind. ii.* 320; *W. and A. Prod.* 296.

Grown in gardens at Kurrachee, Hydrabad, and Kotree.

Bauhinia variegata, *Linn.*; *Roxb. Fl. Ind. ii.* 319.

Vernacular—Kunchun, *Sind.*

Grown in gardens at Kurrachee and Kotree for its flowers.

Adenanthera pavonina, *W.* *Yellow-flowered Adenanthera or Red Wood Tree.*

Linn. Syst. *Decandria Monogynia.*

The wood—Red sandal-wood.

Vernacular—Rucktachundun, Ranjana, *Hind.*; Koochunduna, *Sans.*; Rugtchundun, *Sind*; Thorla-Goonj, *Dec.*

A large unarmed glabrous tree, growing at times to 100 feet. Found wild in some parts of Guzerat and Khandeish, and in Burmah, Bengal and South India. The wood is called "Rucktachundun" or red sandalwood, owing to the color of the heartwood; but the true red sandalwood is the produce of *Pterocarpus santalinus*. It yields a red dye, and is used by Brahmins for making the sectarian mark on their foreheads. The bright scarlet seeds are worn by natives as beads, and by jewellers are used like the seeds of *Abrus precatorius* as a weight, 4 grains being the standard of selected seeds. Beaten up with borax it makes a good cement. Powdered it is said to be useful as an external application to hasten the suppuration of abscesses. In Southern India the leaves are administered as a decoction in chronic rheumatism.—(*Lindley, Graham, Brandis, Ainslie, Roxb., Birdwood.*)

Prosopis spicigera, *Linn.*; *W. and A. Prod.* 271; *Adenanthera aculeata, Roxb.* *Edible Podded Prosopis.*

Linn. Syst. *Decandria Monogynia.*

Vernacular—Jhand, *Punj.*; Kundee, *Sind*; Soundar, *Dec.*; Jhand, *Hind.*; Shemoo, *Bombay*; Shamee, *Beng.*

A large arboreous shrub, or small tree with an erect trunk; branches irregular, glabrous, armed with scattered prickles; leaves alternate, bi-pinnate, 2–3 inches long; pinnæ opposite, 1–4; leaflets 7–10 pair, opposite, oblong, linear, obtuse, glabrous; flowers in axillary spikes, numerous, small, yellow; spikes several, filiform; bractes minute, 1 flowered; calyx cup-shaped, 5-toothed; legumes long, pendulous, cylindric; seeds 10, lodged in a mealy substance.

Common on dry ground in Sind, and ascends to 1,500 feet on the hills and in the salt range. In Beloochistan and Persia, also. Abounds generally as a large shrub in the Central Punjab, and occurs more sparingly to either side, generally associated with *Capparis aphylla* and *Salvadoras*. In Southern, Western, and Central India, and in the dry regions of the Peninsula, as far south as Tuticorin, it is also abundant. Rarely thrives where the annual rainfall exceeds 40 inches. In Sind it attains a height of from 40 to 50 feet, with a girth of 10 to 12. The mealy pulp contained in the pod, which has a sweetish taste, is eaten by the natives either raw or cooked as a vegetable. A gum exudes from the tree, but is not employed medicinally. The tree is worshipped during the Dussera festival. The wood is used for making common doors and native furniture. Good as firewood. Seasoned wood weighs 80 lbs. per cubic foot. Sp. gr. 1·280.—(*Graham, Brandis, Birdwood, Dr. Stewart.*)

Mimosa rubicaulis, *Lam.*; *Hk. Ic. pl. ii. t.* 156; *W. and A. Prod.* 268. *Bramble-stalk Mimosa.*

Linn. Syst. *Polyandria Monogynia.*

Vernacular—Hujeeroo, *Sind*; Khair, *Punjab*; Shiah-kanta, *Hind., Beng.*

A large straggling pubescent shrub, 5–10 feet high; stems, branches, petioles and peduncles armed with scattered hooked prickles; leaves bi-pinnate; pinnæ 3–10 pair; leaflets 12–24 pair, linear, obtuse, unequal sided; spikes panicled, solitary; flowers fasciculate; legumes curved, prickly, three-jointed, 3–5 in. long, ½ in. broad, 6–10 seeded.

Indigenous in Sind, abundant in the outer hills of the Punjab to 3,000 feet and the Siwalick tract, and at times along rivers or canals some way into the plains. Also in Bengal and the Southern and Western Presidencies. -(*Graham, Brandis, Dr. Stewart.*)

Acacia arabica, *Linn.*; *W. and A. Prod.* 277; *Mimosa arabica, Roxb. Fl. Ind. ii.* 557.

Linn Syst. *Polygamia Monœcia.*

The bark and gum.

Vernacular—Babool, Bawur, *Hind.*; Keekur, *Sind.*

Tree, 30 to 40 feet; branches armed with stipular thorns, varying in length from 1½ to 2 inches long; leaves bipinnate; pinnæ generally 3–6 pair; leaflets 15–20 pair, glabrous; petioles 1–2 inches long, pubescent; peduncles slender, pubescent, fasciculate; flowers bright yellow, fragrant, in globose heads; legumes 3–4 inches long, pedicelled, compressed, contracted on both sutures between the seeds.

This tree is cultivated or self-sown throughout the greater part of India. It is indigenous in Sind, the interior of the Deccan, Guzerat, Bengal, and Coromandel Coast, and is cultivated in the Punjab. In the N. W. Himalayas stunted trees are occasionally found as high as 3,000 to 4,000 feet. In Lower and Central Sind it forms extensive forests, frequently associated with other species of acacia. Its average girth has been ascertained to be at 35 years 4 ft., measured 4 ft. from the ground; at 55 years 6 ft., measured 4 ft. from the ground; but under favorable circumstances a much more rapid growth has been noticed. Thus in Jacobabad, the trees planted in 1844 attained in common with the *Sissoo* and other trees, in less than 30 years, a height of from 50 to 60 feet, with girths of 6 to 8 feet. When covered with round heads of yellow flowers it is an extremely ornamental tree.

> "Our rocks are rough, but smiling there
> The Acacia waves her yellow hair,
> Lonely and sweet, nor loved the less
> For flowering in a wilderness."
>
> —*Moore's Lalla Rookh.*

This and all other species yield an abundance of semi-transparent gum, which, from its similarity to the officinal article (the produce of *A. vera*) is substituted for it. It does not exhibit any very characteristic forms like those observable in gum tragacanth, but occurs in semi-transparent roundish masses, of the size of a small nut or larger; often in fragments, rugose at the surface, brittle, friable, fracture vitreous; odourless, of a mild slightly sweetish viscous taste, specific gravity 1·31 to 1·52; selected colorless pieces yielded 3 per cent. of ash, chiefly consisting of the carbonates of potash and lime, with a minute portion of oxide of iron; and containing 79·6 of soluble gum or arabin. This gum is used by dyers and cloth printers, and for a variety of purposes. Medicinally it is employed as a demulcent, in coughs, mucuous discharges and diabetes; pharmaceutically to suspend powders, or to make an emulsion with oily and resinous substances.

The tree also yields a lac from the punctures of a cynips (*Coccus indicus*), particularly on the small branches, and which is collected in great quantities both in Sind and Guzerat. Other species also yield it when suffering from drought, and it has occasionally been seen in small quantities on the *A. eburnea*. The bark of the tree is a powerful astringent tonic, and is supposed to be particularly useful in extreme languor and sinking; also in cases of bites of certain snakes, usually accompanied with spitting of blood and voiding it by urine. A strong decoction is used as a wash for foul ulcers, and as a substitute for soap; and the fine powder, mixed with gingelly oil, as a valuable external application in cancerous affections. As an astringent in leucorrhœa and prolapsus (descent) of the anus, it is favorably reported on by Drs. Delpratt and McGregor. As a gargle in sore throat and spongy gums it is also of much benefit combined with alum. It is employed in tanning leather and for dyeing a reddish-brown; also in the distillation of arrack. The pods are a good fodder for cattle when grass is scarce, and are employed in dyeing.—(*Roxb., Ainslie, Lindley, Birdwood, Graham, Waring, Baz. Med., Loudon, Dr. Stocks, Brandis, Agri-Hort. Socy. Rep. Punjab, Cleghorn Punj. Rep., Dr. Gibson, Royle, Pharm., Pharm. of Ind.*)

Acacia cupressiformis, a variety of the above known as the cypress, or tall broom-like acacia (Kabulee Kekur) occurs planted in Sind, Punjab, and Rajputana.

Acacia Catechu, *W.*; *Roxb. Fl. Ind. ii.* 563. *Medicinal (Catechu) Acacia.*

Linn. Syst. *Polygamia Monœcia.*

The extract of the wood.

Vernacular—Kath, Kutha, Khyar-rus, *Hind.* The tree—Khair, Khyar, *Sind.*

This is a moderate-sized tree, armed with long axillary spikes. Abounds in tropical Africa and parts of Ceylon, Western, Southern, and Central India; also in parts of Burmah. Occurs along the Siwalick tract to 3,000, and occasionally to 4,000 feet up to the Indus. Not indigenous in Sind.

An extract (catechu) kath, kutha, *Hind.*, is prepared by boiling the chips of the heartwood in water and evaporation subsequently in the sun. It is formed into masses, in which state it occurs in the bazaars, or commonly in either square or roundish pieces or balls enveloped in rice-husks, or the leaves of *Nauclea brunonis*, varying in color from a pale whitish or light reddish brown to a dark brown color, either earthy in texture, or presenting a smooth shining fracture. This extract, when first introduced as a medicine into Europe, was named Terra Japonica, from the supposition that it came from Japan and was an earth.

There are several varieties of catechu sold in the bazaars; some are more friable than others; all are without smell, bitter, and astringent. The pale variety is usually distinguished from the dark colored, although both may have been prepared from the same tree, and at the same time. Too much exposure, or long continued heat, is said to produce the dark variety, which is the best adapted for medicinal use, owing to its containing a greater quantity of tannin, on which its astringency depends. Both varieties analysed by Sir H. Davy yielded respectively—

	Tannin.	Extractive or resinoid matter.	Mucilage.	Insoluble residuum.
Dark colored Catechu ...	109	68	13	10=200
Pale „ „ ...	97	73	16	14=200

Catechu is employed with the best effects in dysentery and diarrhœa, when the use of astringents is admissible, in alvine and uterine hemorrhages, leucorrhœa, gleet, and in obstinate catarrhal affections. In mercurial salivation, and in ulceration and sponginess of the gums, a small piece allowed slowly to dissolve in the mouth is often of great service, as also in relaxed sore throat, hoarseness, loss of voice, &c. Chronic ulcerations attended by much fœtid discharge are frequently speedily benefited by the use of an ointment composed of the fine powder and lard; and in obstinate cases with the addition of sulphate of copper. In prolapsus ani and protruding piles, catechu with lard and opium has been found of great service; bathing or fomenting with an infusion of catechu is also beneficial. As a preventive of sore nipples, bathing the breasts daily with the infusion for six weeks or so prior to confinement has proved effectual, by so hardening the tissues that when the infant begins to suck any ill effects are obviated. As a dentifrice it is recommended with finely powdered almond shell or areca nut burned to charcoal. It is also chewed with betel leaf, areca nut, lime and spices, as the national "*pan supari*" by almost all classes of natives in India, both male and female.

An analogous product, the extract of the areca nut, is employed for the same purposes under similar English and vernacular synonymes, but is much inferior in quality and has less virtues, owing to the small amount of tannin present in it.

Catechu is also prepared from the leaves of *Uncaria Gambir.*—(*Roxb. Fl. Ind., Brandis For. Fl., Graham, Cleghorn Punj. Rep., Agri-Hort. Socy. Rept. Punj., Lindley, Loudon, Ainslie, Dr. Stewart, Birdwood, Pereira Mat. Med., Royle, Mat. Med., Paris' Pharm., Pharm., Pharm. of Ind., Duncan's Edin. Disp.*)

Acacia Jacquemonti, *Benth. in Lond. Journ. Bot.* 1842; *Brandis For. Fl.* 183.

Linn. Syst. *Polygamia Monœcia.*

Vernacular—Kundiaree, *Sind*; Babur, *Punj.*

This is a small shrub, seldom rising above 8 feet in height; branches armed with immense white stipular spines, 1–1½ in. long, connate at the base; leaves bipinnate, petioled; pinnæ 2–4 pair, ¼–½ in. long; leaflets greyish green, 5–10 pair, coriaceous; flowers capitate, yellow, peduncled; legumes 2–3 in., long, flat, glabrous, ½ in. broad.

Indigenous in Sind, Central and Western India, the Sulimani Range, ascending to 2,500 feet, and the outer Himalaya near the Jhelum.

Not browsed by cattle on account of its immense spines, but the leaves are thrashed out for them. The bark is used in the distillation of spirits.—(*Brandis, Dr. Stewart.*)

Acacia rupestris, *Stocks.*; *Boiss. Fl. Orient. ii.* 638; *Brandis For. Fl.* 184; *A. Senegal, Willd*; *Hk. Fl. Br. Ind. ii.* 295.

Linn. Syst. *Polygamia Monœcia.*

Vernacular—Khair, *Sind.*

A large shrub, 8–12 feet high, armed with 3 connate thorns, one of which is recurved; leaves small, 1–2 in. long, petioled; petioles prickly; pinnæ 3–6 pair; leaflets of an ash grey color, hairy; flowers sweet-smelling; spikes 2–3 in. long.; corolla yellow; calyx campanulate, deeply toothed; pods oblong, 2–3 inches long, pubescent, 5–6 seeded.

Indigenous in Sind, Rajputana and South India; also Arabia and Egypt.

Acacia eburnea, *W.*; *W. and A. Prod.* 276; *Roxb. Fl. Ind. ii.* 558. *Ivory-thorned Acacia.*

Linn. Syst. *Polygamia Monœcia.*

Vernacular—Nundo-bubber, Nundo-keekur, *Sind.*

A large shrub, 8–12 feet high; branches armed with stipular, connate, twin, ivory white spines, ¼–2 in. long, larger ones white; leaves bipinnate; pinnæ 4–10 pair; leaflets 6–9 pair, oblong, ciliate; flowers globose, yellow, in axillary, solitary peduncles; calyx toothed; legumes linear, generally 2–4; seeds 6–10.

Indigenous in Sind, Afghanistan, the Siwalick tract, extending east to Kumaon; also in the Deccan, Coromandel Coast, Bengal, and South India.

Wood used as fuel; twigs for tooth-brushes.

Acacia Farnesiana, *Willd.*; *Bedd. Fl. Sylv. t.* 52; *Mimosa farnesiana, Roxb. Fl. Ind. ii.* 557. *Sponge Tree.*

Linn. Syst. *Polygamia Monœcia.*

Vernacular—Velaitee Keekur, *Sind*; Gooya-babool, *Dec.*; Orimeda, *Sans.*

A large thorny shrub, 10–15 feet high, armed with stipular, setaceous spines; leaves bipinnate; pinnæ 4–8 pair, with a minute gland or petiole, between two terminal pair of partial leaves;

leaflets 10-20 pair, nearly glabrous; petioles pubescent; spikes long, peduncled, axillary; peduncles filiform, crowded, shorter than the leaves; flowers yellow, fragrant; legumes turgid, round, 2–3 in., containing a spongy pulp in which are embedded two rows of seeds.

Common in Sind, Arabia, the Deccan, Bengal and on the Coromandel Coast. Wood used as fuel; branches lopped for fodder; gum used to adulterate gum arabic.

Albizzia Lebbek, *Benth. l. c.* 87; *Boiss. Fl. Orient. ii.* 639; *Mimosa Sirissa, Roxb. Fl. Ind. ii.* 544.

Linn. Syst. *Polygamia Monœcia.*

Vernacular—Suree, Sirris, *Sind*; Lasrin, *Punj.*

A large glabrous unarmed tree, 30–40 feet high, with a short thick trunk and flexuose branches; leaves bipinnate; pinnæ 1-4 pair; leaflets opposite, 4–8 pair, linear, oblong, blunt, unequal, glabrous; petioles round, tapering, with a gland; peduncles axillary, 2 or more; flowers white, fragrant, pedicelled; calyx campanulate, toothed; petals 5; stamens monadelphous; legumes 6–10 inches long, 10-seeded.

Indigenous in Sind, Afghanistan, Punjab, Egypt, Bengal, and Southern India.

Grows very rapidly, and attains a girth of from 7 to 9 feet in Sind. Wood hard and heavy. A cubic foot weighs 53 lbs. Sp. gr. ·848. The seeds are said to be of service in ophthalmia.

Albizzia odoratissima, *Benth. in Hook. Journ. Bot.* 1844, 88; *Acacia odoratissima, W. and A. Prod.* 275.

Occurs planted in parts of Sind.

N. O. 210. DRUPACEÆ,—*ALMONDWORTS.* Lind.—Bal. 76.

Amygdalus communis, *W. Roxb. Fl. Ind. ii.* 500. *Sweet Almond.*

Linn. Syst. *Icosandria Monogynia.*

The seed.

Vernacular—Buddam, Bhadham, *Hind.*

A moderate-sized, deciduous tree; leaves on glandular petioles, lanceolate, serrulate; flowers solitary, nearly sessile, white, with a tinge of red, appearing before the leaves; calyx campanulate; stamens 5-cleft, numerous, shorter than the petals; ovary woolly; fruit a dry drupe, ovoid, compressed, separating into two valves; mesocarp fibrous; endocarp or putamen woody, one-seeded.

A native of Syria, Turkey, and Barbary, now naturalized in the South of Europe; cultivated in Afghanistan, Kashmere, and the plains of the Punjab, where it does not ripen its fruit; in Persia also, where Tavernier (*Travels in Persia*) states it grows in abundance in the territories of Yezd and Kernian, the bitter and sweet kinds being distinguished by the name of *Badam tulk* and *Badam shereen.* In Sind it is cultivated in gardens as an ornamental tree.

In India it does not appear to be much used in native medical practice. The Arabians and Persians, according to Ainslie (*Mat. Med.*) place blanched almonds (sweet) amongst their aphrodisiacs, and bitter almonds as lithontriptic. The varieties are not distinguished from each other by any particular difference, save the taste of the kernels, and both are said to be sometimes obtained from the same tree. The

best sweet almonds are those called Jordan almonds, which are imported into England from Malaga. There are also other varieties, namely, Valentia, Italian, Portugal, and Oporto; the bitter almonds come chiefly from Mogadore. Both bitter and sweet varieties are imported into India from the Persian Gulf.

Sweet almonds are of greater use in food than in medicine; but are reckoned to afford little nourishment; and, when eaten, are not easy of digestion, unless thoroughly comminuted. In pastry of all kinds, and sweetmeats, they form a very necessary ingredient as a flavoring article; medicinally they are supposed, on account of their unctuous quality, to deaden acrimonious humours and to give relief in heartburn; six or eight peeled and eaten at a time answering the purpose.

The true composition of the kernel was first made known by Boullay, who shews that it contains no starch, and that 100 parts are composed of fixed oil 54, emulsion or albumen 24, liquid sugar 6, gum 3, lignin 4, pellicles 5, water 3·5, and acetic acid 0·5, so that in fact they are analogous to a concrete milk, and an emulsion may be considered as a vegetable milk. The principal constituent of the kernel, as will be seen above, is the oil, which is obtained from both varieties by expression. That of the sweet almond is of a pale yellow, and very liquid, of Sp. gr. 0·917—0·920, consisting of margarine 24 and elaine 76 parts in 100. Its action and uses are laxative and emollient, and it may be employed for the same purposes as olive oil. As a laxative it is mixed with an equal volume of syrup of violets or roses, and given to new-born infants. To assist in allaying troublesome coughs it is not unfrequently used in the form of linctus with confection of hips and syrup of poppies. It also forms the basis of many scented oils.

Bitter almonds are poisonous, and have proved fatal to men, children, and small animals. They contain less fixed oil than the sweet, and a portion of prussic or hydrocyanic acid, upon which their narcotic properties depend. Though not officinal, the oil requires to be noticed, as it is sometimes used therapeutically, and has been found of some service in intermittent fevers. It is a powerful poison. It is used like hydrocyanic acid, and sometimes for the same purposes.—(*Roxb., Ainslie, Loudon, Lindley, Dr. Stewart, Brandis, Cleghorn Punj. Report, Graham, Pharm., Pharm. of India, Royle, Pereira, Duncan, Edin. Disp. and Supplement to Do.*)

N. O. 211. POMACEÆ—*APPLEWORTS*. Lind.—Bal. 76.

Cydonia vulgaris, *Pers.*; *Boiss. Fl. Orient. ii.* 656. *Common Quince.*

Linn. Syst. *Icosandria Di-pentagynia.*

The seed and fruit.

Vernacular—Beehi, Behidana, *Hind.*; Bumsutoo, *Cashm.*; Hubul-sufarjil, *Arab.*

This is a deformed low tree, with oval entire leaves, which are hoary underneath; stipules oblong; flowers white, large, solitary.

A native of the ancient town of Cydon in the island of Crete. Cultivated in Sind, Beloochistan, Afghanistan, Persia, and the plains of the Punjab. Also in the N. W Himalaya ascending to 5,500 feet. Common in Kashmere, where the fruit is said by Vigne to be very fine. Apparently wild in Greece, Thracia, the Caucasus and Armenia. The *κυδωνεα* of Dioscorides, *κυδωνιον* and *στρουθιον* of Theophrastus, and the *Malum cotoneum* of the Romans, called *Melicotones* in old English books. The apples are fragrant, of a yellow color, and downy, and are used in the preparation of a kind of wine analogous to cider, but now chiefly used for flavoring other preparations, or as a preserve. It contains some astringent and nitrogenous matter, with malic acid and sugar (Soubeiron). The mucilaginous seeds are inodorous, nearly insipid, and impart their properties to water. They are highly valued by Mahomedan doctors all over India as demulcent, tonic, and restorative In aphthous complaints they have also proved of service. According to the report of Dr. Newton, a decoction of these seeds proves particularly useful in dysentery, where inflammatory action is present; it seems to line the mucuous membrane, and protect it from irritating fœcal

matter. As a demulcent in gonorrhœa it has also been found useful, and in this way it is largely employed by native practitioners, as also for keeping the system cool, especially in depraved habits. When the seeds are soaked in water overnight in an earthen pot with a sufficiency of sugar-candy, and administered in this way, a very pleasant drink is obtained.

Pyrus Malus, Linn., H. K. Stud. Fl. 125 (a tree about 30 feet high) which produces the apples known as *soof*, is cultivated in Sind, also in the plains of the Punjab and lower Bengal.—(*Lindley, Roxb., Brandis, Dr. Stewart, Birdwood, Loudon, Cleghorn P. Rep., Duncan's Edin. Disp., Royle, Ainslie, Pharm., Pharm. of Ind.*)

N. O. 213. ROSACEÆ,—*ROSEWORTS.* Lind.—Bal. N. O.

Rosa centifolia, *Linn.*; *Roxb. Fl. Ind. ii.* 513. *Cabbage Rose.*

Linn. Syst. *Icosandria Polygynia.*

The flower.

Vernacular—Goolab, Goolabzurdee, *Hind.*

A shrub with erect shoots, thickly covered with large hooked unequal prickles, intermixed with numerous glandular bristles of different sizes and shapes, larger ones falcate; leaflets 5–7, oblong or ovate, glandular-ciliate; flowers terminal, 2–6, together drooping; germs ovate; calyx 5-cleft, fleshy, circeolate.

The native country of this shrub is unknown, but it is said to be indigenous in the Eastern Caucasus. Widely cultivated in all parts of India and in Europe, for its flowers, which are well known for their fragrance, and, with those of *R. damascene*, chiefly used in the manufacture of rose-water and otto of roses. The otto and rose-water of the province of Kerman are of a peculiar freshness, and Kaempfer in his *Amœntates Exotica* p. 374 speaks highly of those of Shiraz, where, it would appear, a great quantity of the essential oil is prepared and exported to other parts of Persia, as well as to all India; and he adds, as a singular fact, that there separates from it a fatty butter, of a delicious odour, prized even more than gold. In Ghazeepore also, where many hundred acres of *R. damascene* are under cultivation, the essential oil and rose-water are prepared. 10,000 roses distilled with water yield only about 180 grains of otto of roses, which varies in color, becomes solid below 80° F., Sp. gr. 0·832 at 90° F., is soluble in alcohol, and a little is taken up by water as in *aqua rosa.* It consists of two principles, one being a solid, the other a liquid volatile oil, the former is scarcely soluble in alcohol. Rose-water is much employed as a perfume, also for softening the flavor of tobacco, and in preparing collyria. It enters into almost every part of the domestic economy of the high class natives, Rajahs, Nabobs and others. It is an accompaniment to all nuzzars (presents) at weddings, feasts, durbars, &c., when it is distributed to and sprinkled on the guests. In ablutions, medicine, and confectionery it is also in demand. The petals of *R. centifolia* are by natives considered as a laxative for infants, given in the form of syrup. They are also an ingredient in *Confectio senna.* Those of *R. gallica* are astringent when dried rapidly, and sometimes found useful in cases of debility. The fruits of *R. canina* have also the same properties. The following are the most commonly cultivated species in Sind:—Rosa bracteata, *Wendl.*; the Macartney Rose, hab. China; Rosa Damascena, Mill; the common Indian Rose, hab. unknown; Rosa Gallica, Linn., hab. Asia Minor; Rosa Indica, Linn., which includes the Indian, China, Bengal, and Tea roses; Rosa anserinæfolia, Boiss., hab. Afghanistan.—(*Ainslie, Journ. As. Socy., Lindley, Roxb., Loudon, Pharm, Hook. Fl. Br. Ind., Brandis For. Flo.*)

Neurada procumbens, *Linn.*; *Boiss. Fl. Orient. ii.* 735; *Hk. Fl. Br. Ind. ii.* 368.

Annual; branches tomentose, depressed, diffuse; leaves ovate, petioled, lobed, tomentose on both upper and lower surfaces; flowers axillary, solitary, short-pedicelled, ¼ in. diameter, calyx-

tube spiny; lobes 5, triangular; bracteoles 5; petals 5; stamens 10; style persistent, subulate; fruit $\frac{1}{4}$–$\frac{3}{4}$ in. diameter, under surface flat; seeds curved, germinating within the carpels.

Indigenous in Sind, Punjab, and probably the N. W Provinces.

Potentilla supina, *Linn.*; *Boiss. Fl. Orient. ii.* 725; *W. and A. Prod.* 300; *Hk. Fl. Br. Ind. ii.* 359.

Annual, with numerous spreading stems; leaves pinnate, membraneous; leaflets 3–9, opposite and alternate, obovate, oblong-cuneate, serrate; stipules ovate, entire; pedicels axillary, solitary; flowers smaller than the calyx, yellow.

Indigenous in Upper Sind; found also in Afghanistan.

The roots are employed in Sind as a febrifuge.

ALLIANCE 43. *SAXIFRAGALES.*

N. O. 214. SAXIFRAGACEÆ,—*SAXIFRAGES.* Lind.—Bal. 105.

Saxifraga ligulata, *Wall.* *Ligulate Saxifrage.*

Linn. Syst. *Decandria Digynia.*

The root.

Vernacular—Pakhan-bed, Silphora, *Hind.*; Batpia, *Jhelum.* The root—Pakhan-bea, Jintiana, Muslan, *Sind, Punjab.*

A small plant, with leaves about a foot in diameter, and handsome flowers, often growing on rocks, &c. from 4,500 to 13,000 feet in the Punjab Himalaya, up to the Indus. The leaves are frequently used as plates where the plant grows; and the root is reckoned absorbent and given in dysentery and cough, &c. (*Dr. Stewart*). In Sind the root is rubbed down and given in honey to children when teething.

N. O. 218. LYTHRACEÆ,—*LOOSESTRIFES OR LYTHRADS.* Lind.—Bal. 78.

Ammannia vesicatoria, *Roxb. Fl. Ind. ii.* 258. *Blistering Ammannia.*

Linn. Syst. *Tetrandria Monogynia.*

Vernacular—Dadhmaree, *Beng.*; Junglee Meyndee, *Hind.*

An herbaceous erect-stemmed glabrous annual, rising from 6 to 20 inches high; lower branches opposite, upper ones alternate; leaves opposite, sessile, lanceolar, smooth; flowers axillary, in cymes; corolla 4-petalled or none; calyx 1-leaved, partially covering the capsule, 8-toothed; capsule depressed, 2–4 celled, many-seeded.

Indigenous in Sind, Punjab, Kutch, Afghanistan, and the Bengal and Bombay Presidencies; found in moist localities towards the close of the rains.

The plant has a strong muriatic but not disagreeable smell. The leaves are highly acrid, and are universally used by natives as a vesicant in rheumatic pain, fevers, &c., and though it performs its office effectually, it is not recommended, owing to the length of time required (generally from 30 to 40 minutes) to raise a blister, and the pain caused, which is more intense than by cantharides. In celerity and certainty of action this remedy is far inferior to *Plumbago rosea.* Dr. Bholanath Bhose describes a mode of treatment of obstinate spleen disease by the juice of the leaves administered internally; but in consequence of the agonizing pain it occasions and uncertain results, it is considered an ineligible remedy. The bruised leaves are used as an application in herpetic diseases.—(*Roxb., Dr. Stewart, Pharm. of India, Lindley, Graham.*)

Lawsonia alba, *Lam. ill. t.* 296, *fig.* 2; *Lawsonia inermis, Roxb. Fl. Ind. ii.* 258. *Henna Plant.*

Linn. Syst. *Octandria Monogynia.*

The leaves and fruit.

Vernacular—Mayndee, *Hind., Dec., Guz.*; Saka-cheera, *Sans.*; Shudee, *Beng.*; Urkan, *Arab.*; Hayna, *Pers.*; Nukreez, *Punj.*; Mayndee, *Sind.*

A shrub 6–10 feet high, with a crooked trunk and angular branchlets, which are sometimes spinescent; leaves opposite, short petioled, oblong or broad lanceolate, entire, glabrous; stipules wanting; panicles terminal, many-flowered; flowers small, greenish yellow, pale green or rose, fragrant; calyx 4 fid; petals 4; stamens 4 pair, capsules 4-locularis; seeds many.

Indigenous in Beloochistan and on the dry hills of the Coromandel Coast; also in some parts of Persia and Arabia; cultivated in Sind, the Deccan, and Northern, Central, and Southern India. Much prized in gardens for hedges; grows readily from cuttings. Sir Samuel Baker, in his *Nile Tributaries of Abyssinia* (page 3) mentions it as growing in considerable quantities on the left bank of the Nile; and in describing it states that the leaves resemble myrtle, the blossoms have a powerful fragrance, and grow like a feather 18 inches long, forming a cluster of small yellow flowers.

The leaves are in common use in Egypt and throughout India by native women, chiefly Mahomedans, for staining their finger nails, for which purpose they are beaten up with catechu, and applied before retiring at night; when taken off next morning the skin and finger nails are tinged a reddish orange. The natives of the Deccan grind them with catechu, alum, lime, and a few grains of (jowaree) the seeds of *Soorghum vulgare.* Mahommedan men dye their beards with the paste, and also the manes and tails of their horses. Henna leaves are likewise esteemed for their medicinal properties, and are probably of some value as an astringent. Berthelot found them to contain gallic acid. In burning sensation of the feet, the leaves macerated and applied to the soles, relieve it. Friction with them is also said to be of equal efficacy. In Southern India an extract is prepared from the fragrant flowers, leaves, and tender shoots, and prescribed as a valuable remedy in lepra and other depraved habits of the body, the dose being half a tea-spoonful twice a day. An infusion of the leaves is also used as a fomentation in bruises and sprains.—(*Roxb., Brandis, Ainslie, Graham, Dr. Stewart, Birdwood, Lindley, Pharm of Ind., Baker's Nile Tributaries.*)

Grislea tomentosa, *Willd. ii.* 321; *Roxb. Fl. Ind. ii.* 234.

Linn. Syst. *Octandria Monogynia.*

Vernacular—Dhai-phul, *Sind*; Dha, Dhaur, *Punj.*

An erect shrub with rust-colored bark; twigs drooping; leaves opposite, stem-clasping, lanceolate, cordate at the base, hispid beneath; racemes axillary, 5–15 flowered; flowers red; calyx red, 12-toothed, persistent; capsules 2-celled, 2-valved, with the calyx attached; seeds large, numerous, reniform.

Sind, Beloochistan, Punjab, Sivalick tract, and Salt range up to 4,000 feet, and often higher; also in Bengal and the Circars.

The flowers are employed in dyeing, and in medicine are considered astringent, and applied in plaster for headache, &c. in the Punjab. In remittent fever and diarrhœa especially, an infusion is said to act beneficially. The leaves are also considered officinal in the Punjab.—(*Dr. Stewart.*)

ALLIANCE 41. *RHAMNALES.*

N. O. 219. PENÆACEÆ,—*SARCOCOLLADS.* Lind.—Bal. 184.

Penæa mucronata, *W.* *Heart-leaved Sarcocollad.*

Linn. Syst. *Tetrandria Monogynia.*

The gum resin—Sarcocolla.

Vernacular—Unzeeroot, Kunjadeh, *Arab.*, *Pers.*; Ghost-khore, *Pers.*

A shrub, indigenous in Arabia, Persia, and North Africa, from which is obtained a sub-viscid, sweetish and somewhat nauseous gum-resin under the above synonymes, which Endlicher remarks is not the product of this plant, and Lindley that it is more likely to be the product of an umbellifer. It is a yellow or reddish granular substance, friable and semi-transparent, softening but not melting by heat, soluble in alcohol; its aqueous solution is precipitated by tannin, of Sp. gr. 12·68, and contains a peculiar principle named *Sarcocollin*, a semi-transparent, crystalline, brittle, gum-like substance, which has never been detected in any other vegetable matter, and which has the property of forming oxalic acid when treated with nitric acid. Sarcocolla was supposed by the Arabians to possess, as its name indicates (Sarz *flesh*, kolla *glue*), the power of agglutinating wounds. Some of the more ancient Arab writers, such as Mesue, seem to have considered it as, in a certain degree, cathartic; but he says of it "*purgat pituitam crudem et alias humores crassos,*" though it does not appear to have been in much repute. In modern native medical practice it is used as an external application to sloughing ulcers, and as a cathartic and anthelmintic.—(*Lindley, Brandis, Dict. of Science, &c., Ainslie, Birdwood, O'Shaughnessy.*)

N. O. 220. AQUILARIACEÆ,—*AQUILARIADS.* Lind.—Bal. 186.

Aquilaria Agallocha, *W.* *Eagle-wood.*

Linn. Syst. *Diœcia Monadelphia.*

The wood.

Vernacular—Aggur, *Hind.*; Ayaloogoo, *Arab.*; Oodi-hindi, *Pers.*

A native of the mountainous districts east and south-east of Sylhet; also of Assam, growing to 120 feet in height, with a trunk 12 feet in girth. Doubts still exist as to this being the true eagle-wood of commerce. Dr. Roxburgh says there can be little or no doubt that the real Calumbac or Agallochum of the ancients is furnished by this tree; but there is a difference of opinion on the subject. Both Royle and Wallich, however, coincide with Roxburgh; and Ainslie says, what is commonly understood by *Calumbac* or *aloes-wood* in commerce is the interior part of *A. ovata* (Linn.), and is, in fact, the dark part, possessing a peculiar aroma, caused by the oleaginous particles there stagnating and concentrating. Its pores are filled with a soft resinous substance, which is considered as a cordial by some Asiatic nations, and has occasionally been prescribed in Europe in gout and rheumatism. It is what Celsus speaks of under the name of *Agalocki*, ranking it amongst medicines which invigorate the nerves. Loureiro observes that from the bark of the tree the common paper of the Cochin-Chinese is made; and that the *Calumbac* or inner part is a delightful perfume, and is serviceable in vertigo and palsy, and that the powder by its corroborating power restrains fluxes and vomiting. Calumbac or eagle-wood is also used for making ornaments and rosary beads, and as an incense in temples.—(*Roxb*, *Ainslie, Brandis.*)

N. O. 221. ULMACEÆ,—*ELMWORTS.* Bal. 201.

Celtis tetranda, *Roxb. Fl. Ind. ii.* 63; *C. caucasica, Willd.* *European Myrtle Tree.*

Linn. Syst. *Pentandria Digynia.*

Vernacular—Tagho, *Sind*; Takkum, *Afg.*

A small deciduous tree 30–40 feet, with spreading branches; young shoots, bifarious, villous; leaves alternate, bifarious, oblong-lanceolate, acuminate, finely serrate, scabrous above, under-surface clothed with soft down; stipules linear, lanceolate, caducous; flowers peduncled, axillary, yellowish white; pedicels longer than the petioles; drupe ovoid, glabrous, size of a pea, black when ripe.

Found cultivated in Sind; wild in Beloochistan and Afghanistan; 2,500 to 8,500 feet in the Punjab plains, and Trans-Indus to 1,500 feet.

This tree is supposed to be the *Lotus* of the ancients. The timber is exceedingly hard, tough, and evengrained, but seldom used, except for agricultural purposes. The wood weighs from 52 to 54 lbs. per cubic foot. Sp. gr. ·832 to ·864.

The fruit is eaten by the natives. In the Punjab it is used as a remedy in amenorrhœa, and Bellew states that it is administered for colic.—(*Dr. Stewart.*)

N. O. 222. RHAMNACEÆ,—*RHAMNADS.* Lind.—Bal. 70.

Zizyphus jujuba, *W. and A. Prod.* 162; *Roxb. Fl. Ind.* i. 608. *Blunt-leaved Zizyphus.*

Linn. Syst. *Pentandria Monogynia.*

The fruit.

Vernacular—Unab, Onab, *Arab.*; Bare, *Hind.*; Kuchra, *Punj.*; Kinar, *Pers.*; Kurkunda, *Punj.*; Beyr, Jangra, *Sind.*

A moderate-sized tree, with a short, rather crooked, seldom straight stem, the greatest girth of which is about 10 feet; branches numerous, armed with short stipular spines, frequently in pairs, one straight, the other recurved; ends of branches drooping; leaves alternate, roundish, ovate, blunt, tomentose underneath, serrate, short-petioled; peduncles axillary, many-flowered pedicels longer than peduncles; calyx one-leaved, spreading, penta-partite; drupe globular, oblong or ovoid, dark brown, orange or red when ripe; seed irregular, furrowed, 2-celled, osseous. A very variable species.

Self-sown and cultivated in Sind, Beloochistan, and Afghanistan. In the Punjab Dr. Stewart says it is doubtful as to it being wild, although it is common all over up to 3,000 and occasionally 4,000 feet. It is also common in Southern and Western India.

There are several varieties of this species growing throughout India, the result of cultivation, soil and climate. The root of this species, which is insipid, is used by native practitioners in conjunction with several warm seeds as a drink in fevers. The bark is used as a dye stuff. The fruit is much esteemed by natives, and may be eaten with impunity. The same, dried, is sold by druggists as a remedy in bronchitis. The wood is hard and tough and used for making charpoy legs, camel saddles, &c. Seasoned wood weighs 80 lbs. per cubic foot.—Sp. gr. ·912.—(*Brandis, Roxb., Graham, Loudon, Cleghorn Pun. Rept., Agri-Hort. Cult. Socy. Punj.*)

Zizyphus nummularia, *W. and A. Prod.* 162; *Boiss. Fl. Orient. ii.* 13.

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Beyr, Jangree, Nundo-jangro, *Sind*; Karkunna, *Afg.*; Jar-beyree, Malla-beyr, *Punjab.*

An extremely dumose prickly shrub, seldom growing above 6 feet high, and with scarcely any stem; branchlets slender, bifarious, flexuose, covered with a greyish white pellicle, and armed with a

pair of stipular spines; the upper one straight, as long as the leaves, the lower shorter, recurved; leaves alternate, short petioled, obtuse, ovate, or oval; margins finely serrate; under-surface tomentose; flowers 10–15, aggregate, axillary, short peduncled; drupe globose, the size of a pea or a little larger.

Indigenous in Sind, in the Bolan, in Beloochistan, and in the Punjab, ascends to 3,500 feet; on the Eastern flanks of the Suliman range, also in Southern and Central India, and above the Bhore Ghauts from Lanowlee to Decksal and Sholapore.

The fruit is eaten and in some parts used medicinally in bilious affections. The leaves are beaten off the bush for fodder.—(*Dr. Stewart.*)

Zizyphus vulgaris, *Linn.*; *Roxb. Fl. Ind. i.* 609. *Common Zizyphus.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Beyr, Ber, *Sind*; Fitni or Pitni-beyr, *Hind.*; Kundiaree, Biraree, *Punjab.*

A small tree 10–15 and sometimes 20 feet high, with flexuose branches armed with twin stipular spines; one straight, the other recurved; leaves ovate, retuse, toothed, smooth; under-surface hoary; flowers axillary, fasciculate, on short slender pedicels; drupes oblong; kernel 2-celled, sharp-pointed, osseous.

Occurs in Sind, Beloochistan, Punjab, N. W. Himalaya, ascending to 6,000 feet; also the Deccan and Guzerat. Fruit, though small and rather acrid, is much relished by natives.

Sageretia Brandrethiana, *Aitch.*; *Linn. Journ. viii.* 62.

Vernacular—Momanna, *Afg.*, Ganger, *Sind, Punj.*

Fruit occasionally brought to the bazaar at Jacobabad, but whether indigenous or cultivated is not known. Occurs abundantly in the Punjab Salt Range, Afghanistan, and Belooochistan.

N. O. 225. CELASTRACEÆ,—*SPINDLE TREES.* Lind.—Bal. 68.

Celastrus paniculata, *Willd.*; *Sp. pl. i.* 1125; *Roxb. Fl. Ind. i.* 621.

Linn. Syst. *Pentandria Monogynia.*

The seed.

Vernacular—Malkungnee, *Hind., Dec., Sind, Punj.*

A large climbing shrub growing in Bengal, Assam, the Concans, South India, hilly parts of the Concans, and in the outer Himalaya of the Punjab, from 2,000 to 4,000 feet. The seed of the fruit is of a rusty brown color, of an ellipsoid shape, and about one-fifth of an inch in length, and yields by rude dry distillation a black empyreumatic oil, which is used by natives, and found to be of much service in rheumatism. In beri-beri it has in some cases proved an effectual remedy; in others, however, it failed. It is a powerful stimulant in doses of 10 to 15 drops, and in this character its action is generally followed in a few hours by free diaphoresis, unattended by subsequent exhaustion. It is also used for burning in lamps, but only by the distillers,—the price being greater than of common oils, prevents its general use for illumination. In veterinary practice it is much employed. The bark of *C. scandens* and *Senegalensis* is ground to a paste, and applied to the head, with *mustard* or *cleome* oil for destroying pediculi. The leaves of *Catha edulis*, a tree of this order, are considered stimulant and intoxicating by the Arabs, who eat them greedily, and believe that they have the power of causing extreme watchfulness. They also regard this plant as an antidote to the plague, believing that a twig carried in the bosom prevents infection.—(*Lindley, Graham, Dr. Stewart, Pharm.*)

N. O. 227. SAPOTACEÆ,—*SAPOTADS.* Lind.—Bal. 135.

Mimusops kaki, *W.* *Obtuse-leaved Mimusops.*

Linn. Syst. *Octandria Monogynia.*

The seed of the fruit and root.

Vernacular—Kirnoe, *Hind.*; Rajun, *Dec.*

A large and handsome tree 50 to 60 feet high, indigenous in Ceylon, Southern and Western India, and the Punjab. The palatable nutritious fruit is eaten by natives, and the seed employed as a tonic and febrifuge: powdered and applied externally (a little being put under the lids) it is employed as a cure for ophthalmia. The root and bark of the tree are considered astringent, and administered in honey after being ground with water, in infantile diarrhœa. From the aromatic flowers of *M. elengi* a fragrant oil is distilled, which is used both as a stimulant medicine and as a perfume. According to Dr. Bholanath Bhose a decoction of the bark forms a good gargle in salivation. From the seeds of the fruit of *Bassia butyracea*, a tree of this order, a concrete oil is obtained known by the name of *Fulwah* butter. It has the consistence of lard and melts at 120° Fahr. Unlike the oil of *B. longifolia* and *B. latifolia* it does not become rancid by keeping. As an external application in rheumatic and other painful affections it is held in high esteem by the natives.—(*Roxb., Lindley, Dr. Stewart, Brandis, Graham.*)

N. O. 228. STYRACACEÆ,—*STORAXWORTS.* Lind.—Bal. 126.

Styrax Benzoin, *W.* *Gum Benjamin Tree.*

Linn. Syst. *Decandria Monogynia.*

The balsam—Benzoin.

Vernacular—Ood, Lobanee Ood, *Hind.*; Hussee, Luban, *Hind.*

This is a tree of considerable size, a native of Java, Sumatra, Siam, Laos, and Borneo. It yields a balsamic resin (the benzoin of commerce), which is obtained by making incisions in the bark in its seventh year, and allowing the exuding liquid to concrete by exposure. There are three kinds of benzoin known in commerce, viz., Malacca, Sumbranee, and Ood; and these are respectively called *head, belly,* and *foot* benzoin, from the circumstance that these varieties are obtained according as the tree advances in age. Their relative value to each other is 105, 45 and 18, and they are esteemed according to their whiteness, semi-transparency, and freedom from admixture. The white or fine quality, termed Malacca Sumbranee, or *head* benzoin, is that procured from the tree during the first three years, and has a very fragrant odour, with but little or no taste. The mass is white or yellowish, and somewhat translucent. That which is obtained during the next 7 or 8 years is browner in color, and less valuable, and is known as the *belly* benzoin; while a third sort, called *foot* benzoin, is obtained by splitting the tree and scraping the wood. This last is mixed with much bark and refuse; and being the least expensive, is used by the Malays and Arabs, and the poorer classes of natives in India, as an incense in their houses and temples. The early Greeks and Romans, and Arabian physicians do not appear to have been acquainted with this drug. As a medicine, benzoin has been long known and employed in the East. In Bengal it is called Looban, a name which in N. W. India is applied only to Olibanum. In Persian works on Materia Medica it is distinguished by the names of Hussee or Assa-looban and Hussee-ul-Jawee. It is prescribed internally, and held in deservedly high repute by natives, and is employed also in European practice in the treatment of chronic coughs, consumption, and other affections of the lungs, but it is scarcely ever prescribed alone. In irritable states of the bladder it has also been found of much service. It is used in the preparation of Paregoric Elixir and of Court Plaster, and also in the cosmetic called "Virgin's Milk." A fragrant secretion of a similar nature is produced by *Styrax reticulata, S. ferruginea* and *S. aurea* in Brazil; and, according to Martius, it is used in the churches there as frankincense. Benzoin has a specific

gravity of 1·092. Heated, it melts and emits white irritating fumes of benzoic acid, also of an empyreumatic oil (60 per cent),—in which Berthelot has proved the presence of styrol,—and finally burns away. It consists of a trace of volatile oil, benzoic acid about 20 per cent., resin 78 to 80 per cent., and woody matter and water.—(*Roxb., Royle, Pereira, Lindley, Birdwood, Ainslie, Pharm., Pharm. of Ind.*)

Symplocos cratægoides, *Hamilton*; *Don. Prod. Fl. Nepal.* 145.

Linn. Syst. *Polyadelphia Polyandria.*

The bark.

Vernacular—Lodur, Pathanee Lodh, *Punj., Sind.*

A moderate-sized tree, occurring in the Himalaya, from 3,000 to 8,000 feet from near the Indus to Assam. Scarce towards the N. W.

An oil is said to be extracted from the seeds, and the leaves as well as the bark are employed for dyeing in conjunction with madder. The bark is considered tonic in the Punjab, according to the Hindoo system of medicine. It is also used in Ophthalmia. The bark of *S. racemosa* is used in Rajpootana for dyeing red, and also for making a red powder called "Abeer."—(*Dr. Stewart, Cleghorn, Brandis, Lindley.*)

ALLIANCE 45 *GENTIANALES.*

N. O. 231. APOCYNACEÆ,—*DOGBANES.* Lind.—Bal. 141.

Rhazya stricta, *Decaisne, in Jacq. Voy. Bot. t.* 111. *Brandis For. Fl.* 322.

Linn. Syst. *Pentandria Monogynia.*

The leaves.

Vernacular—Sehar, Seewur, Ishwurg, *Sind*; Sunwar, *Hind.*; Gundera, *Punj.*

A small glabrous shrub, with alternate, sessile, linear-lanceolate leaves; flowers white, sweet-smelling; calyx free, 5-pointed, persistent; corolla monopetalous, 5-lobed; tube longer than lobes; stamens 5; fruit 2 erect, cylindrical follicles; seeds numerous, flat, winged.

Indigenous in Sind, Punjab, Afghanistan, Beloochistan, and Arabia.

The leaves are administered in Sind in infusion for eruptions, also in low fevers and general debility. Dr. Stocks, in a letter to Dr. Forbes Watson, describes the infusion as a good and peculiar bitter-tonic, and recommends it for future trial. Steeped for some days the leaves are given as fodder for goats.

Wrightia antidysenterica, *R. Br.* *Oval-leaved Rose-Bay.*

Linn. Syst. *Pentandria Monogynia.*

The seed.

Vernacular—Katuj, *Sans.*; Inderjow, *Guz.*; Dowla Koorah, *Hind.*; Lisan-ul-Assafir, *Arab., Punj.*; Ahir, *Pers.*

A small tree from 20 to 30 feet high. A native of the Malabar and Coromandel Coasts; common in Mysóre, the hilly parts of Southern India, in Ceylon, the Concan, Oudh, Bengal and Central India; also in the Sub-Himalayan tract, ascending to 3,500 feet, and extending westward to the Chenab. The bark, which is of a dull rusty color, astringent and bitter, was formerly imported into England under the name of "Telicherry and Conessi bark." It has long been considered a valuable tonic and febri-

fuge, and has enjoyed considerable repute as an antidysenteric. Loureiro, in his account of its medicinal virtues for which it is so much in repute in Cochin China, states "*De virtute arboris, antidysenterica testari non audeo experientia destitutus.*" Virey in his *Histoire naturelle des medicamens* speaks of it under the appellation of *Cropal*, observing that it is eminently antidysenteric and febrifuge. In fact there is abundant testimony of its efficacy in these characters. A strong opinion in its favor, based on its employment in numerous cases of dysentery, is expressed by Sub-Assistant Surgeon Odeychund Dutt, and by Drs. Bowser, Bholanath Bhose, and others. Dr. Gibson states he has employed it extensively as an antiperiodic, and there are many such testimonies of its efficacy when other remedies had failed. The milky juice is used as a vulnerary. The seeds, which are often confounded with those of *Wrightia tinctoria*, and which they resemble, have a pleasant taste, are not unlike oats in appearance, and about ½ an inch long, of a cinnamon brown, convex on one side, and concave and marked with a longitudinal pale line on the other. An infusion of the toasted seeds is prescribed as a safe and gentle restrainer in bowel complaints; is said also to allay vomiting in cholera, and to arrest hæmorrhage from piles. The decoction, according to Rheede, is employed in ardent fever and gout; and as a vermifuge. —(*Roxb., Brandis, Dr. Stewart, Graham, Lindley, Ainslie, Birdwood, Pharm. of Ind.*)

Nerium odorum, *Solander; Willd. i.* 245; *Roxb. Fl. Ind ii.* 2. *Sweet-scented Oleander.*

Linn. Syst. *Pentandria Monogynia.*

The root.

Vernacular—Kuneyoor, Kunnayra, Kharzara, *Hind., Punj., Pers.*; Lal Khurubee (red var); Sufaid Kharuba (white var).

A shrub 6–7 feet high, leaves tern, rigid, linear-lanceolate, 3–6 inches long, a little more than ¼ inch broad, produced in bunches at the end of the branches; under-surface irregularly pitted; mid-rib prominent; segments of the calyx erect; nectaries multipartite; laciniis filiform; flowers red, or rose-colored, crimson, or white.

This plant, which is often confounded with the *Nerium oleander*, grows wild in Sind, Beloochistan, (at Muskaff and in the Bolan,) Afghanistan, and North-west and Central India, also on the banks of rivers in the Deccan, in the plains of the Punjab, in the salt range along the Siwalick tract, and in the outer Himalaya, ascending to 5,500 feet. In India several varieties are found, viz., the white, red, crimson, rose-colored, double and single. The single red, called *Lall karroobee*, is a native of Syria. All the varieties are cultivated in Indian gardens for the sake of their flowers, which are sacred to Siva, and are used by natives in religious ceremonies. All parts of the plant are medicinal. The bark of the root and the leaves are considered by the natives as a powerful repellant, applied externally. The root is also employed medicinally. In leprosy it is said to have been given, but with doubtful results. Much caution is necessary in its use, as it is an *acrid poison*, and as such is frequently resorted to by native women, who disguise the bitter taste by Fænugreek seeds. In a fatal case, death, according to Dr. Greig, was due to the directly depressing influence which the drug exercised on the nervous system. The stalks are in some places used as hookah tubes; and the leaves, dried and powdered, given in colic. Bellew states that in this form it is also used as an errhine in neuralgia. In decoction it is used as a wash to destroy cutaneous vermin; and the powdered bark and wood constitute the basis of an efficacious rat-poison. The leaves, bark, and root of the *Nerium oleander*, a species common in the Levant and in the Isle of Candia, are also acrid and poisonous, and are used for purposes similar to *N. odorum*. The leaves of *N. tinctorium* yield a blue dye equal to indigo, and it is thought by Roxburgh might be cultivated for the purpose.

In Sind camels sometimes eat the leaves of *N. odorum*, but they always prove fatal. —(*Lindley, Loudon, Ainslie, Roxb., Dr. Stewart, Brandis, Graham, Cleghorn, Punjab Report, Pharm. of India, Stocks.*)

N. O. 232. LOGANIACEÆ,—*LOGANIADS.* Lind.—Bal. 142.

Strychnos Nux Vomica, *W. Poison Nut.*

Linn. Syst. *Pentandria Monogynia.*

The seed.

Vernacular—Koochla, Kajra, *Hind., Punj.*; Ezerakee, *Pers.*

A moderate-sized tree, with short crooked trunk, and greenish white flowers ranged on terminal, pubescent, pedunculate corymbs. It is a native of Southern India, Burmah and Bengal; found also in Siam, China, and Australia. The pulp of the fruit is said by Roxburgh "to be innocent." Firminger and Hanbury (Pharmacographia), on submitting it to chemical analysis, found that "the inspissated pulp, diluted with water, formed a consistent jelly, having a slightly acid reaction and bitter taste. Some of it, mixed with slaked lime, dried, and then exhausted by boiling chloroform, left on evaporation a yellowish resinoid mass, which was warmed with acetic acid. The crystalline white residue which was obtained from the solution was dissolved in water and precipitated by bichromate of potass, and, after being dried and moistened with strong sulphuric acid, exhibited the violet hue characteristic of strychnine." They add: "To confirm this experiment we obtained through the obliging assistance of Dr. Bidie of Madras, some of the white pulp taken with a spoon from the interior part of the ripe fruit, and at once immersed *per se* in spirits of wine. The alcoholic fluid gave abundant evidence of the presence of stychnine."

Notwithstanding the poisonous action and bitter taste of the pulp, due to the strychnine and brucine it contains, many authors assert that it forms the food of a number of birds. Beddome in his *Flora Sylvatica* also says it is quite harmless.

Nux vomica (the seeds of the fruit) were unknown to the ancients. They were early used in medicine by the Hindoos, and being a product of India, their properties must have been investigated long before they could be known to foreign nations. They are round, flattened, and concavo-convex; from ½ an inch to an inch in diameter, very tough and horny, covered with a velvety down consisting of fine hairs of remarkable structure; color light or yellowish grey; inodorous but of an intensely bitter taste, containing two alkaloids, *strychnia* and *brucia*, united with a peculiar acid, the igasauric—called also strychnic—acid; also a yellow coloring matter, a concrete oil, gum, starch, bassorin, and a small quantity of wax. The proportion of strychnine varies from ¼ to ½ per cent., and that of brucine is variously stated to be 0·12 (Merck), 0·5 (Wittstein), 1·01 (Mayer) per cent. *Strychnine* also occurs in the bark of this tree, and in the bark and root of several other species of the genus.

Nux vomica is a powerful stimulant to the spinal cord, causing in large doses twitching of the muscles, followed by tetanic rigidity, and death from asphyxia. It acts as a bitter stomachic, and in some forms of dyspepsia, as in pyrosis, often relieves It gives tone and contractile power to the intestines, and when combined with purgatives, increases their power and effectiveness. In the treatment of paralysis in paraplegia and hemiplegia it has been employed, also in giving tone to the muscular system, in cases where debility has succeeded severe illness. It has been found to possess considerable power in relieving certain functional affections of the nervous system, as in low spirits of an hysterical character, also to give tone in impotence from nervous exhaustion. Its power as an aphrodisiac is often well marked. In small and repeated doses it promotes the appetite, assists the digestive process, and increases the secretion of urine. In South India the natives are of opinion that if the seeds are not taken in sufficient quantity to cause death, they will produce mental derangement. The fine powder of the seeds intimately mixed with *Margosa* (*Melia Azadarichta*) oil, the Tamools, according to some German and Swedish physicians, consider tonic and astringent, given in minute doses, and recommend it in chronic rheumatism. Blended with the white of egg they employ it as a repellant. According to Dr. Fleming, the seeds are employed by natives of Hindostan in the process of distilling arrack for the purpose of rendering the spirit more intoxicating. The root, like that of *S. colubrina*, is employed on the Malabar Coast in cases of snake-bites and in the cure of intermittent fevers. The

Arabians also prescribe the root in snake-bites. The bark of this tree, which is often substituted for the innocent febrifuge bark of *Soymida febrifuga* under the name of *Rohun*, was some years ago sent into European commerce under the name of False Angustura bark; but the distinction between the true and false barks was pointed out by Sir W. O'Shaughnessy in 1837. It is now seldom met with in commerce. Professor Christian considers it probable that from the quantity of strychnine in it, it might be advantageously substituted for the *seeds* in the preparation of strychnia. *Strychnos toxifera* is another virulent poison which forms the basis of a celebrated poison called "Wooraly" or "Ourari." Dr. Hancock thinks it is the most potent sedative in nature. It is reported to have been recently successfully experimented with in cases of hydrophobic paroxysms and in traumatic tetanus. From the bark of the root of *Strychnos Tirute*, another powerful poison is prepared in Java, where it is called "Tjettek" or "Upas Raja"; it acts like *nux vomica*, but in a more intense and violent manner.—(*Roxb., Royle, Mat. Med., Ainslie, Graham, Brandis For. Flo., Loudon, Pharm, Pharm. of Ind., Pereira Mat. Med., Garrad's Mat. Med. and Ther., Taylor on Poisons, Duncan's Edin. Disp.*)

Ignatia amara, *Linn.*; *Strychnos Ignatia, Berg.*; *Roxb. Fl. Ind. i.* 575.

Linn Syst. *Pentandria Monogynia.*

The seed—St. Ignatius's bean, Nux Serapionis.

Vernacular—Papeeta, *Hind.*

A large climbing shrub growing in the Bisayan group of the Phillipine Islands and Cochin China. The fruit, according to Pereira, is of a pyriform shape, and contains 20 seeds embedded in a glutinous pulp. These seeds (*Nux Serapionis*) are about an inch in length, ovate, triangular, and of a reddish grey color, intensely bitter, and contain a larger quantity of strychnine than the *Nux vomica* seeds, which renders them a more powerful poison. They were first introduced into Europe from the Phillipine Islands by the Jesuits, who, on account of their virtues, named them after their patron. In Germany they were made known about the same period by Bohn of Leipsic. Analysed by Pelletier and Caventou they were found to contain 1·5 of *strychnine* and about 0·5 of *brucine*, besides wax, concrete oil, *bassorin* and *lignin*. The uses are the same as *Nux vomica*. They were formerly given as a febrifuge, and are so now in modern native medical practice, but rarely. Also prescribed in conjunction with other drugs in *cholera*. Much caution is necessary in administration, as giddiness and convulsions are known to follow exhibition. Even a very small overdose, half as much again as actually necessary, would be fatal.—(*Lindley, Pharm., Pharm. of Ind., Taylor on Poisons, Royle.*)

N. O. 235. OROBANCHACEÆ,—*BROOMRAPES.* Lind.—Bal. N. O. 159.

Phelipæa calotropidis, *Walp.*

Vernacular—Khalatra, Bhoiphore, *Hind., Sind, Punjab.*

A leafless parasite, with succulent stems 2–3 feet high, covered with scales, and terminating in purple flower-spikes; calyx divided, persistent; corolla monopetalous, hypogynous, irregular, persistent; stamens 4, didynamous; fruit capsular, enclosed in the withered corolla; placentæ 4, equidistant, in pairs upon the face of the carpel.

Found in Sind, Beloochistan, and at Chaman in south Afghanistan in sandy places; also in Trans-Indus, and the Punjab Salt Range to 1,500 feet, growing on the roots of *Calotropis procera* and *gigantea*, or near them, pushing through the sand, from which circumstance it is named "Bhoenphore," which means "earth-splitter." The bruised stem is applied to sores in horses, and in Mozuffurnuggur the tops are said to be used as fodder. *Phelipæa lutea* is used for dyeing black the ropes prepared in Egypt from the fibre of the *Doum palm.*—(*Stewart, Brandis, Birdwood, Lindley.*)

N. O. 236. GENTIANACEÆ,—*GENTIANWORTS*. Lind.—Bal. 143.

Ophelia chirata, *Roxb. Gentiana cheyrata*; *Roxb. Fl. Ind. ii. 71.*

Linn. Syst. *Tetrandria Monogynia.*

The herb.

Vernacular—Cherayta, Kurroo, *Hind.*

An annual, 2–3 feet high, indigenous in Northern and Southern India and throughout Bengal, where it is universally employed as *Gentian* is in Europe. It has long been known to the Hindoos. The first English account is that of Dr. Fleming in *Asiatic Researches* XI, p. 167, who referred it to the genus *Gentiana*, others to *Swertia*, and the late Professor Don to *Agathotes*. Griesbach now refers it to *Ophelia*. It is called in Sanscrit *Kirataka* or *Kiratatikta*, which means the bitter plant of the *Kiratas*, an outcast race of mountaineers in the North of India. Several species are also used besides this; as the *Ophelia angustifolium* (Don), *Ophelia elegans* (Wight), *Ophelia densifolia* (Gries), *Ophelia paniculata, purpurascens, speciosa,* and others all common throughout the Himalaya, and Southern, Western, Northern and Central India; and possessing bitter properties, may, when found, be substituted for the officinal *chiretta* which is rare to the west of Nepaul, and not found in Central and Western India. According to Dr. Cleghorn (*Indian Annals of Medical Science*) *O. elegans*, which inhabits the mountains of the Madras Peninsula, possesses a powerful and persistent bitterness. He states that frequent trials with it confirm the belief that it exercises a tonic influence on the digestive organs, thereby improving the general health. It appears also to possess some power as an antiperiodic, and to be equal, if not superior, to the officinal *chiretta*. (For other interesting reports of this drug see *Pharm. of Ind.* p. 146.)

Chiretta is met with in the dried state, tied up in bundles of long slender stems of a brownish color, having the roots attached, which have been taken up when the plants were in flower. Analysed by MM. Bonisil and Lassaigne it yielded a resin, a yellow bitter substance, a yellow coloring matter, gum, malic acid, salts of potash and lime, and traces of oxide of iron. Mr. Battley states that it contains—1, a free acid; 2, a very bitter extractive and resinous matter, and much gum; 3, muriates and sulphates of lime and potash. The chief results of a careful chemical analysis of this important drug made by Mr. Hohn, one of Professor Ludwig's assistants, at the request of Messrs. Firminger and Hanbury, are described in their Pharmacographia; which results, they say, exhibit no analogy with those obtained in the analysis of the European *Gentians*. *Chiretta* is a pure bitter tonic, devoid of aroma and astringency. In bitterness it exceeds *Gentian*. It is in use as such by all classes of natives and in European practice. Its febrifugal properties are in high estimation with European practitioners in India, who use it instead of *cinchona* when the latter is not to be procured.—(*Royle, Pereira, Roxb., Pharm., Pharm. of Ind.*)

N. O. 237. OLEACEÆ,—*OLIVEWORTS*. Lind.—Bal. N. O. 138.

Olea ferruginea, *Royle, Ill. t. 65*; *Olea cuspidata, Wall. Tab. xxxviii.*

Linn. Syst. *Diandria Monogynia.*

Vernacular—Khow, Kahoo, *Sind*; Zaitoon, *Afg.*; Khawan, Kau, *Punjab.*

A middle-sized tree, rising to a height of from 20 to 25 feet, and sometimes even to 35 feet; with a short trunk 6–10 feet in girth; branches crooked, spreading; leaves opposite, ovate, lanceolate, cuspidate, upper side glossy green, under-surface covered with dense minute ferruginous scales, midribs prominent, nerves partially visible; flowers white, in axillary clusters; corolla 4-cleft, with a short tube; calyx campanulate, small, 4-toothed; drupe ovoid, of a purplish black.

Indigenous in Sind, the Trans-Indus territory, Afghanistan, Beloochistan, the Punjab Salt Range, and in many parts of the N. W. Himalaya, ascending to 6,000 feet. It is also found in the Jumna basin to the eastward. The fruit is eaten by the natives of the countries where the tree abounds, although it is said there is not much pericarp on it, nor is it pleasant tasted. An oil extracted from it in Afghanistan, is said to be almost equal to that obtained from the European species, and used in medicine.

The timber is exceeding hard and heavy and takes a good polish. It is much used for making combs, and is prized in turnery. A cubic foot weighs 65 lbs.; sp. gr. 1·040. A sweet concrete exudation called Manna (Shirkhist) is said to be produced by a species of Olea in Khorassan, and from the *Fraxinus ornus*, another genus of this order, which is used as a laxative, chiefly for children, and women advanced in pregnancy.—(*Brandis, Dr. Stewart, Lindley, Birdwood.*)

ALLIANCE 46. *SOLANALES.*

N. O. 238. SOLANACEÆ,—*NIGHTSHADES.* Lind.—Bal. 157, 158.

Nicotiana tabacum, *Tournf.*

Linn. Syst. *Pentandria Monogynia.*

The leaf.

Vernacular—Tambakoo, Tamak, *Hind.*

This is a common species largely cultivated all over India, and, together with other varieties, all over the world. By a proclamation of Jehangir, and the mention of it in his memoirs, it would appear to have been introduced into India either in his or the preceding reign. Humboldt in his personal narrative states that it was first discovered in the Mexican provinces of Yucatan in 1520, and that it was there called *Petum*; it was afterwards transported to the West Indies and North America, and brought to Europe by Hernandez de Toledo, who came from Florida to Portugal in the beginning of the 16th century. The seeds were sent from Portugal to Catherine de Medicis by Jean Nicot, an agent of Francis, after whom the plant has received its generic name. It was introduced into England by Ralph Lane in 1586, on the return of Sir Francis Drake with the Virginian colonists; and the practice of smoking having been adopted by Sir Walter Raleigh and other courtiers, soon became common; and, by the end of the 16th century, had become general throughout Europe, Turkey, Egypt, India and China, notwithstanding that it was opposed by the severest enactments both of Christian and Mahomedan Governments, among others the notorious phillipic of James the First, entitled "A Counterblast to Tobacco." In 1624, Pope Urban the VIII. published a decree of excommunication against all who took snuff in the church. Ten years after this, smoking was forbidden in Russia, under pain of having the nose cut off. In 1653 the council of the canton of Appenzel cited smokers before them, whom they punished, and ordered all innkeepers to inform against all who were found smoking in their houses. The police regulations of Bern, made in 1661, were divided according to the Ten Commandments, in which the prohibition of smoking stands immediately beneath the command against adultery; this prohibition was renewed in 1675, and the tribunal instituted to put it into execution, viz. *Chambreau Tabac*, continued to the middle of the eighteenth century. Even so late as 1719 the Senate of Strasburgh prohibited the cultivation of tobacco, from an apprehension that it would diminish the growth of corn. Amurath IV. published an edict which made the smoking of tobacco a capital offence; this was founded on an idea that "it rendered the people infertile."

Tobacco is now, however, used over a wider area than any other narcotic, and probably in a larger quantity, excepting perhaps the leaf of the Piper Betel (Pan), and the popularity of both is, probably, owing to the gentle, continuous and cheerful calm of mind which they are capable of sustaining. According to Christison it has the power of removing exhaustion, listlessness, and restlessness from many individuals who habitually use it; especially when brought on by bodily or mental fatigue; and this property is the basis of its general use as a luxury. The Arab cultivates it in the burning desert, the Laplander and Esquimaux risk their lives to procure a refreshment so delicious in their wintry solitude, the seaman, grant him but this luxury, will endure with cheerfulness every other privation, and defy the fury of the raging

elements; and in the higher walks of civilized society, at the shrine of fashion, in the palace, and in the cottage, the fascinating influence of this singular plant commands an equal tribute of devotion and attachment.

As found in commerce, tobacco is of a yellowish brown color, soft and pliable, a little clammy, with something of a *honey*, blended with a *narcotic* odour; the latter, however, is not obvious in the fresh leaves. The taste is bitter, acrid and nauseous. For medical purposes the Virginian tobacco is best adapted. Its active properties are taken up by water, spirit and wine; but are destroyed by heat.

According to Buchner, the seeds of tobacco yield to alcohol a pale yellow extract which contains a compound of nicotine and sugar; by destructive distillation, as in a pipe, tobacco yields an acrid empyreumatic oil which is highly poisonous.

In native medical practice tobacco is used to excite vomiting; and in cases of obstinate constipation the leaves are warmed and applied to the orifice of the anus with never-failing success. It is also used for fumigating persons who have suffered from venereal complaints of long standing, and a protracted course of mercury, with much benefit. In European practice it is used in tetanus, dropsical affections, spasmodic affections of the abdomen, retention of urine, and as a means of inducing muscular relaxation. As a local application it has been employed to relieve pain and irritation in rheumatic swellings, syphillitic nodes, &c. Tobacco smoking is sometimes effectually resorted to in asthma, spasmodic coughs, and sleeplessness. It is a soother of the nervous system, and a partial equivalent to food; besides this effect on the nerves, it has the opposite power of gently exciting the thinking faculty, probably by allaying the uneasiness occasioned by exertion, which would otherwise distract the attention. Its influence in retarding the waste occasioned by the "wear and tear" of labour, and in rendering the digestion of the food more protracted, has, in a measure, the effect of nourishment. When, however, tobacco produces, on the one hand, undue excitement, or on the other, depression, or a sense of langour and a desire for stimulating drinks, it should be avoided. Sinking or craving at the stomach, or nervous tremor following smoking, is fair warning that it should be discontinued. Young people should refrain from it, and those free from care and anxiety, and not enduring bodily or mental labour, will do well to forego its use.

In middle age, and later in life, by the majority of men constituted as the world is, the peculiar properties of tobacco are regarded as a most striking and beneficial provision of Providence. Dr. Gardner adds, "it would be a better topic for writers to exercise their ingenuity, to trace the influence of food and habits on human progress, than to attempt by imaginative hypotheses and doubtful narratives of its abuse, to take away an enjoyment accessible to the poorest as to the richest classes."—(*Royle, Roxb., Dr. Stewart, Ainslie, Birdwood, Lindley, Pereira, McCulloch's Commercial Dict., Dr. Ure's Arts and Manufacture, Gardner's Household Medicine, Pharm., Pharm of Ind.*)

Datura alba, *Rumph. Amb. V.* 242; *D. Metel. Willd. Sp.* 1009; *Var. fastuosa.* *Dhatura or White-flowered Thorn Apple.*

Linn. Syst. *Pentandria Monogynia.*

The seed—black and white species.

Vernacular—Black species—Kala Datura; White species—Suffaid Datura, *Hind.*; Jowz Mazil, Nabrak, *Pers.*; Tatoora, *Arab.*

A large spreading annual, 2–4 feet high; leaves ovate, acuminate, repandly toothed, unequal at the base, downy; flowers white, tubular, 5–6 inches long; capsules round, spinous; do not open in regular valves, as in *D. stramonium,* but split in different directions into irregular fragments; seeds about three-eighths of an inch in length; reniform, flattened, somewhat shrivelled, of a light yellowish brown color, having a disagreeable and somewhat acrid taste.

Common in Sind, and throughout the Western and Southern Presidencies and the Punjab. Datura has long been medicinally used by the Hindoos. It possesses very

strong narcotic properties, and has been fatally employed by thieves, who administer it to deprive their victims of the power of resistance. Its properties and uses are similar to those of *D. stramonium*. Although it is a valuable medicine, much caution is necessary in its employment; as, in overdoses, it acts as a powerful narcotic poison. In asthma the dried leaves and stems, cut small, and smoked like tobacco in a pipe, afford in many cases great relief; when these fail the dried seeds, thought to be more powerful, may be used. In rheumatic swelling of the joints, lumbago and painful tumours, the leaves as a topical application prove very serviceable, also in relieving the pain attendant on painful or difficult menstruation and some affections of the uterus. In neuralgic pains, especially of the face, a liniment made by macerating for seven days an ounce of the bruised seeds in a pint of *Sesamum* or other bland oil, well rubbed in over the seat of pain, affords immediate relief. In cases of guinea-worm Datura poultices made by bruising the fresh leaves into a pulp and mixing this with an equal quantity of rice flour, and sufficient water to bring it to a consistence, are said to be most useful in relieving the pain and hastening the expulsion of the worm. The leaves of the white variety are sometimes chewed with the same object. A tincture of datura seeds made by macerating in proof spirit for seven days in a closed vessel, and then pressing and filtering, is said to produce all the sedative and narcotic effects which could be expected from opium, and to be much cheaper. In Rajpootana mothers smear their breasts with the juice of the leaves to poison their new-born female children.—(*Roxb.*, *Royle*, *Pharm. of Ind.*, *Waring's Baz. Med.*, *Graham.*)

Hyoscyamus niger, *W. Henbane.*

Linn. Syst. *Pentandria Monogynia.*

The seed.

Vernacular—Khorassance Ajwan, *Hind.*; Bazar-ul-bang, *Pers.*; Damtura, *Sind*; Bunj, *Arab.*

A coarse erect annual, found throughout Europe, and in Egypt, Asia Minor, the Caucasus and Persia. Not uncommon in waste ground near houses, throughout the Punjab plains, and up to 9,000 feet in the Himalayas. It is also mentioned by Griffith, as being found in Afghanistan; cultivated in Southern and Western India. At Hewra in the Deccan, it was cultivated by Dr. Gibson, who prepared an extract from it, and found it equally as efficient as that imported. It is the Υοσκύαμος μελας of Dioscorides, by whom it was particularly commended as a medicine, and from whose, and other writings it appears that different species of Henbane have been long so in use. By Celsus it was applied externally as a collyrium in ophthalmia, and as an anodyne; and Pliny speaks of it in various ways; "Succus hyoscyami etiam sanguinem excreantibus; nidor quoque accensi tussientibus" (Vol. 3 cap. V. p. 70). "Succus hyoscyami cum axungia articulis."

Forskahl in his materia medica *Khainina*, mentions Henbane as being brought from Greece to Egypt and administered to procure sleep; adding that it might with safety be given to children. Though a remedy undeniably potent, it was for a long period entirely relinquished, until revived by Dr. Storck of Vienna in cases where an anodyne was requisite, but where there are objections to the use of opium. In modern practice it is in much favor, and the *extract*, or inspissated juice, is the best form in which it can be exhibited. It is employed by oculists, as also is the extract of belladonna, to cause dilation of the pupil of the eye, in order to facilitate operations, a solution being either dropped in direct, or the extract rubbed on the temples. The leaves form an anodyne cataplasm; and the smoke from the seeds (Khorassani Ajwan) is recommended in severe fits of odontalgia. It is also smoked with tobacco for asthma. The roots at one time were commonly strung in the form of beads and sold as anodyne necklaces, to tie round the necks of children to facilitate the growth of their teeth, and allay the irritation of teething. Analysed by Brandis, Henbane seeds yielded gum, starch, albumen, a large proportion of fixed oil, with a variety of salts and an oily-like highly poisonous substance, resembling Conia. *Hyoscyamus insanus* (Stocks), a plant common in Beloochistan and known in Sind as *Kohi-bang*, is mentioned in the *Pharm. of India* as of considerable virulence. It is said to be smoked by faquirs, and to be used for criminal purposes.—(*Royle*, *Duncan's Edin. Disp*, *Dr. Stewart*, *Graham*, *Ainslie*, *Paris' Pharmacologia*, *Pharm.*, *Pharm. of India.*)

Physalis somnifera, *Dunal, Wight. Ic. Vol iii. t.* 853. *Clustered Winter-Cherry.*

Linn. Syst. *Pentandria Monogynia.*

The root and fruit or cherry.

Vernacular—Asgund, *Hind., Dec.*; Baymun, *Arab., Sind.*

A shrubby plant, 3–4 feet high, with flexuose branches; leaves oblong, ovate, often opposite, short-petioled; flowers axillary, subsessile, crowded, small, greenish, the calyces growing out and enclosing the berry, which is usually about the size of a pea, of a purplish color when ripe.

Common in Sind, the Punjab, Beloochistan, Afghanistan, the Deccan, and Concan, also Travancore, Coromandel, Bengal and throughout the Madras Presidency. The root in external appearance is not unlike gentian, and has little taste or smell. By the people of Southern India it is considered to have deobstruent and diuretic qualities, and to be extremely useful in rheumatic and dyspeptic complaints. In the Punjab and Sind it is used for lumbar pains, and is considered aphrodisiac. It is often used in Sind to cause abortion. The leaves are applied as a poultice to ulcers and inflamed tumours.—(*Roxb., Dr. Stewart, Ainslie.*)

Puneeria coagulans, *Stocks, Hk. Him. Jour.; Dunal, Wight. Ic. Vol. iv. t.* 1616.

Linn. Syst. *Diœcia Pentandria.*

The berry.

Vernacular—Kakunj, *Hind., Pers.*, Puneer-ja-fota, *Sind*; Jouz-ul-fota, *Arab.*; Khumzooray, *Afg.*; Aroosakpas-pardah, *Pers.*

This is a small shrub, with light-colored leathery leaves, densely covered with short stellate hairs arranged in tufts. Common in Sind and Beloochistan on hilly ground, Trans-Indus, and along the Salt range to 4,500 feet; occurs also in the Southern Punjab near houses or fields; seldom in the absolute desert. It is universally used throughout Sind and Beloochistan for curdling milk to make *cheese*, whence its Persian name "*Puneer.*" The ripe fruits, when fresh, are used as an emetic in Sind. When dried, they are obtainable in the bazaar under the name of *Pùnser-ja-fota*, and are used in dyspepsia, colic and other intestinal affections. They are also supposed to possess anodyne or sedative properties. Honigberger states that the bitter leaves are given as a febrifuge by the Lohanees.—(*Dr. Stewart, Pharm. of Ind., Stocks, Bombay Asiatic Socy.'s Journal.*)

Capsicum annuum, *W. Common Capsicum.*

Linn. Syst. *Pentandria Monogynia.*

The fruit—dry chillies.

Vernacular—Mirch, Mirchee, Lal-mirchee, *Hind., Sind.*

A shrubby plant, originally a native of South America, cultivated extensively throughout India. The several species of Capsicum (*C. frutescens, baccatum, grossum, minimum*, and others) are all natives of South America, whence they have been introduced into different parts of the world, and become universally diffused. The berry or fruit of *C. annuum* called "chilly" is long, pointed and pendulous; when ripe of a bright orange red, of an aromatic and pungent odour, taste extremely acrimonious and fiery. Its qualities are partially extracted by water, but more completely by spirit. Analysed by Forchhammer it yielded a red coloring matter, a nitrogenous substance, mucilage and some salts; and among these, nitrate of potash and *capsicine*, a white, brilliant, pearly and very acrid alkaline body.

Capsicum is a most powerful stomachic stimulant; and is unaccompanied with any narcotic effect. It is employed in medicine in combination with cinchona in intermittent and lethargic affections, and also in atonic gout. It is a valuable adjunct to bitters, tonics and other stimulants, in weak states of the stomach; in cold leuco-phlegmatic habits, dyspepsia and flatulence, and as a gargle in relaxed states of the throat it is highly extolled, and has also been used with success in the advanced stages of rheumatism. As a counter-irritant, in its spirituous solution it has also been employed with effect. In native practice it is given, in conjunction with assafœtida and sweet flag root, in cholera; and is also used as a rubefacient in the absence of mustard; added to a mustard poultice it increases its activity. By German physicians it is supposed to be particularly injurious in gonorrhœa As a condiment its use is universal everywhere.—(*Royle, Dr. Stewart, Pharm., Waring's Bazaar Medicine, Ainslie, Lindley, Gardner's Household Medicine.*)

Solanum Jacquini, *W. Jacquin's Solanum or Nightshade.*

Linn. Syst. *Pentandria Monogynia.*

The plant and fruit.

Vernacular—Kunth, Kathoola, Karoo, *Punj., Hind.*; Ringnee, *Hind., Dec.*; Adayree-jee-denay, *Sind.*

A procumbent, diffuse, prickly plant; leaves frequently in pairs, oblong, laciniate, armed on both sides with straight spines; calyx prickly; flowers bluish purple; berries spherical, smooth, drooping when unripe, marked with green and white; ripe berries yellow.

Found abundantly in Sind, Beloochistan, and throughout the Punjab plains; occasionally to 5,000 feet in the outer hills; also on the Coromandel Coast, in Travancore, and the Southern and Western Presidencies. The small bitterish sub-acid berries, as well as the root, are used medicinally by natives, and considered expectorant. They are prescribed in coughs and consumptive complaints, also in humoral asthma, in the form of decoction and pill. The stems, flowers and fruits, according to Dr. Wilson (*Cal. Med. Phys Trans.*), are bitter and carminative, and are prescribed in those forms of burning of the feet (Ignipedilis) which are attended with a vesicular watery eruption. Fumigation with the vapour of the burning seeds of this plant through a tube is in high repute among natives of Sind for the cure of toothache. The fruit of *Solanum incertum* (*Kah peroo*, Sind) a species common in Sind, is eaten, and the leaves are employed in certain skin diseases. The juice of the leaves is stated by Dr. Shortt to be an excellent remedy in the aphthæ of childhood. The berries of *S. nigrum*, a species also found in Sind and the Punjab, are eaten and prescribed medicinally in anasarca. The root of *S. Indicum* is stated by Dr. Horsefield, in his account of the medicinal plants of Java, to possess strong exciting qualities; and Rumphius states it is employed in difficult parturition. The berries of *S. dulcamara* excite vomiting and purging, and the twigs and leaves have been used in rheumatic and scorbutic cases with good effect —(*Roxb., Graham, Lindley, Loudon, Pharm., Ainslie, Stocks.*)

The cultivated species are *Solanum melongena*, Willd.; (Roxb. *Fl. Ind. i.* 569) an esculent vegetable commonly known as the Brinjal or Egg apple; also *S longum*, Roxb. *S. trilobatum*, Burns, (Roxb. *Fl. Ind. i.* 571,) is common all over the plains in all soils.

Lycium Europæum, *Linn.; Sibthorpe. Fl. Græc. t.* 236. *European Lycium.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Gangro, Ganger, *Sind*; Kungoo, Chirchitta, *Punj.*

A small thorny shrub, with lax, grey, spiny branches, and oblong, lanceolate, obtuse, obliquely-bent leaves, pubescent when young; flowers white, solitary, ½ in. long, pedicels shorter

than flower; calyx 5-dentate, campanulate, sub-cylindrical; corolla-tube twice the length of the lobes; filaments glabrous; anthers almost in the mouth of the tube; berry globular, red, often yellow.

A native of Lycia in Asia Minor. Common in Sind, the drier parts of the Punjab plains, from Delhi, west to the Suliman range, also in Guzerat, and the Deccan. The fruits are eaten by natives and are used in medicine in native practice, being considered aphrodisaic. The plant is browsed by camels and goats.

Lycium barbarum, *Linn.*; *Miers. Ill. S. Amer. Pl.*

Will probably be found in Upper Sind and the Punjab. Occurs in the Bolan Pass, Beloochistan, and on the Khoja Amran range in South Afghanistan.

N. O. 239. ASCLEPIADACEÆ,—*ASCLEPIADS.* Lind.—Bal. 140.

Hemidesmus Indicus, *H. K.*; *Periploca Indica, Willd.*; *Roxb. Fl. Ind. ii.* 39. *Indian Sarsaparilla.*

Linn. Syst. *Pentandria Monogynia.*

The root.

Vernacular—Unantamool, Muckwee, Moograbo, *Hind.*

twining shrub, growing commonly in Bengal, Madras, Bombay, Travancore and the Concan, the roots of which have, under the above synonymes, been long used in native practice as a substitute for Sarsaparilla. Ashburner in 1831 was the first to call the attention of the profession to its medicinal value. It occurs in pieces of various lengths of a yellowish brown color; cylindrical, tortuous, furrowed longitudinally; the cortex divided by annular cracks; odour peculiar and aromatic; taste feebly bitter and agreeable. Its virtues reside in a volatile oil, and a crystallizable principle, which Dr. Christison is of opinion is in reality only a stearopten, which he mentions having long since obtained by simple distillation of the root with water.

The diuretic effects of the root of this plant are remarkable. It also acts as a diaphoretic and tonic. In constitutional debility, cachexia—especially of children—and other diseases in which sarsaparilla is employed, it has been given with signal success. It is often used in the form of a syrup, but the best mode of administration is that of infusion, the proportions being the same as in the infusion of sarsaparilla. The addition of milk makes it so like tea, that children will take it readily. In Southern India it is recommended by native practitioners in cases of gravel and strangury, given in powder in cow's milk. They also give it in decoction in conjunction with cummin seed (*Cuminum cyminum*) to purify the blood, and correct the acrimony of the bile. On the Malabar Coast the root of *Smilax aspera* is also used for the same purposes.—(*Ainslie, Waring's Bazaar Medicine, Pharm. of Ind., Royle, Lindley, Birdwood, Pharm.*)

Periploca aphylla, *De Caisne in Jacq. Voy. t.* 116; *Brandis. For. Fl.* 330. *Leafless Periploca.*

Linn. Syst. *Pentandria Digynia.*

Vernacular—Barrareo, Barree, *Punj.*; Buraye, *Sind.*

A shrub with erect, leafless stems, and pubescent extremities, having occasionally a few small, thick, oblong-lanceolate leaves; flowers small, purple, in trichotomous cymes; follicles cylindrical, divaricating, smooth; seeds comose.

Common in Sind, and in many places Trans-Indus; also in the Salt Range, outer Himalaya eastward to the Chenab, ascending occasionally to 3,500 feet. Found also in Arabia, Egypt and South Persia.

In Sind the milky juice of the plant is applied to tumours and swellings. The

flower buds are eaten as a vegetable either cooked or raw. The milk of *Periploca Græca* is very acrid, and has been employed where found, as a wolf poison. The roots of *Periploca sylvestris* are supposed by native practitioners to possess virtues in cases of snake-bites; the powder being applied externally, and a decoction administered internally. The root of *Periploca emetica*, a native of the mountains of Malabar, is used as a substitute for *Ipecacuanha*.—(*Brandis, Dr. Stewart, Lindley, Ainslie.*)

Calotropis gigantea, *R. Br. Wight. ill. t.* 155. *Curled-flowered Calotropis.*

Linn. Syst. *Pentandria Monogynia.*

The bark, root and milky juice, dried.

Vernacular—Beej-elosha, *Sind*; Ussar, Uk, Mudhar, *Hind.*

A large shrub 6–10 feet high; leaves ovate or oval, opposite, subsessile, cordate at the base, 4–8 inches long, coriaceous; segments of the corolla spreading, revolute at the margin; flowers purple or purplish red, on long pedicels, pale-white silvery appearance on the outer side.

Common in Sind, Beloochistan, Afghanistan, the Deccan and Concans, upper provinces of Bengal, the Southern Presidency, Punjab, and the Trans-Indus territory, ascending to 3,500 feet: extends also to Persia, Palestine, Arabia, Egypt, Nubia and Abyssinia. In Central Sind it grows to a height of about 12 feet with a girth of about 5 feet. The flowers of the plant exhale a strong but not unpleasant scent. The bark of the root and the inspissated milky juice are used in native medical practice; the former under the name of "*Mudar*" has attained a high repute in the treatment of leprosy, syphilis, rheumatism, dropsy, tape-worm, ulcers, and intermittent fevers. Abundant testimony in favor of its employment in leprosy is given in various medical journals. As a remedy in the dysentery of natives Dr. Durant has reported on it very favorably. Its uses in syphilitic affections and other skin diseases are summarised by Dr Casanovas in his *Essai sur le Mudar—Calotropis Mudaris.* The principle "Mudarine" was first discovered in the dried root by Dr. Duncan, who found that it acted as an emetic, and regarded it as the active principle of the root. The following are the directions given by Dr Waring in his *Bazaar Medicine*, for collecting and preparing the root for medicinal use:—"The roots should be collected in the months of April and May from sandy soils, and all particles of sand and dirt having been carefully removed by washing, they should be exposed in the sun, until the milky juice becomes so far dried up that it ceases to flow on incisions being made. The bark is then carefully removed, dried, reduced to powder, and preserved in well corked bottles." In small doses (from 2 to 5 grains), long continued, its action is that of an alterative tonic; in larger ones (from 30 to 60 grains for adults), it acts freely as an emetic, and in this character it is regarded by some as one of the best substitutes for ipecacuanha. The fresh juice is used as a rubefacient, and the leaves as a cure for guineaworm. The inspissated milk is a powerful alterative and purgative. It is used as an application to swelling and ulcerous tumours; also with salt for removing hair from hides, and in the preparation of catgut. The fibres of the bark of the plant are very serviceable in the manufacture of twine and fishing nets, and the silky floss of the seeds for stuffing pillows.—(*Dr. Stewart, Pharm., Pharm. of Ind., Waring's Bazaar Medicine, Lindley, Ainslie.*)

Calotropis procera, *R. Br.*; *Ham. in Linn. Soc. Trans. xiv.* 246; *Brandis For. Fl.* 331.

Vernacular—Ak, Mudar, *Sind*; Spalwuk, *Afg.*

A large shrub 6–8 feet high; leaves hoary, glabrous, 4–9 in. long, thick, subcoriaceous, ovate-oblong; inflorescence covered with white woolly tomentum; flowers purplish red, pale silvery outside, on pedicels twice their length, in terminal or axillary corymbose cymes.

Occurs commonly in the dry arid and sandy plains of Sind, Kutch, Rajpootana, Punjab, Central India, Beloochistan (in the Bolan Pass), Afghanistan and Persia. Distributed very widely.

The root-bark and bark of the plant are used for the same purposes as those of *C. gigantea* and possess the same medicinal properties. Not unlike *C. gigantea*, the floss of the seeds is an excellent substitute for cotton in stuffing pillows, &c.

Sarcostemma viminale, *R. Br.* *Trailing Sarcostemma.*

Linn. Syst. *Pentandria Digynia.*

Vernacular—Soma, Somalutta, *Hind.*, *Beng.*

A perennial, leafless, twining plant, generally climbing on *Euphorbia tirucalli*, with numerous cylindric branches and branchlets, terminal umbels, and glabrous pedicels and calyx; calyx pentapartite, outer corolla 10-plicate, 10-crenate, leaflets of inner corona gibbous on the back, equal to the gymnostegium; flowers small, white.

Indigenous in Sind and Beloochistan, Bengal, Madras, and the Western Presidency, also extremely common on the Coromandel Coast.

It yields a greater quantity of milky juice than any other of its order, and what is rare, it has an acid taste. Travellers in Bengal and other parts of India often suck the tender shoots to allay thirst. Native farmers in the Deccan use the plant to exterminate white ants from their sugarcane fields. The twigs are tied in bundles and put into the trough by the side of the well from which the fields are watered, with a bag of salt hard packed, so that it may dissolve gradually. The water so impregnated destroys the ants without injury to the crop. The plant dried and powdered is used in visceral obstructions and jaundice, and a decoction of the fresh leaves as a febrifuge and tonic.—(*Roxb.*, *Lindley*, *Ainslie*, *Graham.*)

Oxystelma esculentum, *Roxb.*; *Asclepias rosea*, *Roxb. Fl. Ind. ii.* 40; *Periploca esculentum*, *Willd.* *Esculent Oxystelma.*

Linn. Syst. *Pentandria Digynia.*

Vernacular—Gharote, *Punj.*; Garay Kheeree, Dhoodhee, *Sind*; Doodlutta, *Beng.*, *Hind.*

A twining perennial with linear, lanceolate, opposite and smooth, veiny leaves; racemes axillary; flowers (during the rains) large, white, with a slight tinge of rose color, and streaked with purple veins.

Common in Sind and in the arid tracts of the Central and Southern Punjab on milk-bush hedges. The plant is used in decoction as a gargle in aphthous ulcerations of the mouth, and in sore throat. In Sind the milk is collected from the plant, dried, and used in warm water for washing ulcers. It is said to be a valuable cure for itch, combined with turpentine. The fruit is eaten and the plant browsed by cattle.—(*Roxb.*, *Dr. Stewart*, *Graham.*)

Dæmia extensa, *R. Brown*, *Cynanchum cordifolium*, *Jacq.* *Hairy-flowered Cynanchum.*

Linn. Syst. *Pentandria Digynia.*

Vernacular—Chuggul-Bantee, *Beng.*; Sagwanee, *Hind.*; Ootrum, *Dec.*; Trottoo, Seealoe, Kureal, *Punj.*; Kharyal, *Sind.*

A twining perennial, with rather an unpleasant smell; leaves opposite, broad-cordate, with a deep sinuosity at the base, downy, glaucous beneath; peduncles and pedicles elongated,

filiform; margins of corolla ciliated; flowers in umbels, of a dirty white color, pedicelled, fœtid; follicles ramentaceous.

Extremely common in Sind, occasionally found in the Punjab Salt Range and the Trans-Indus. On the Coromandel Coast and throughout the Deccan it is abundant; generally seen among hedges and bushes, and near *Calotropis gigantea*. A decoction of the leaves is given to children as an anthelmintic; the juice of the same in asthma, and combined with lime in rheumatic affections. It has emetic and expectorant virtues ascribed to it by natives, and is much employed by them in the diseases of children. It attracted some attention in Madras in 1858 as a remedy for snakebites, but the identification of this plant with the one employed in the case that recovered under very hopeless circumstances, is incomplete; and no other evidence of its value in this character is on record. The fibre is also used in the manufacture of strong cordage, and is commercially known as "Ootrum fibre."—(*Ainslie, Roxb., Lindley, Pharm. of Ind., Dr. Stewart, Jury Rept. Madras Exhibn.*)

Ceropegia esculenta, *Edge.* *Esculent Ceropegia.*

Linn. Syst. *Pentandria Digynia.*

Vernacular—Galote, *Punj.*, *Sind.*

A twining perennial, with a tuberous root not unlike a turnip, but smaller; stems herbaceous, succulent, 2–6 feet long; leaves petioled, opposite, obovate, pointed.

Indigenous in Sind, the Punjab, and the Southern and Western Presidencies, where it grows in abundance during the rains, and is eaten by the natives—either in pickle, curries, or as a vegetable. The fresh roots taste like turnips. Besides this there are also indigenous in Sind *Ceropegia candelabrum* and *Ceropegia acuminata*, the tubers of which are also eaten as a vegetable. The stems of *Boucerosia edulis* (Edge.) and *Boucerosia aucheri* (Decnisne), and the leaves and fruit of *Caralluma adscendens* and *Cynoctonum saxatile* (Stocks), species indigenous in Sind, are also eaten as vegetables. Bellew states that *B. Aucheri* is used (Trans-Indus) as a vermifuge; and Masson mentions that, dried and powdered, it is administered as a stimulant. From the long and tenacious fibres of *Orthanthera viminea* (Wight, Jacq. Voy. Bot. t. 115) and *Leptadenia Jacquemontianæ*, both indigenous species, ropes are made for Persian water-wheels and moats in Sind, and in some parts of the Punjab. They are preferred to other kinds, as water will not rot them.—(*Roxb., Graham, Lindley, Stocks, Royle, Dr. Stewart.*)

Orthanthera viminea, *Wight.*; *Jacq. Voy. Bot. t.* 115; *Brandis For. Fl.* 335.

Vernacular—Khip, *Sind*; Chapkia, *Punj.*

A glabrous leafless shrub, with minute scales in the place of leaves; grows from 3 to 6 ft. high with erect branches; flowers green, ¼ in. long on short pedicles, and in pedunculate, axillary, unbelliform cymes of 3–6 flowers; peduncles, pedicels, calyx and corolla villous, with long soft hairs; calyx 5-partite.

Found in Sind, Punjab, Beloochistan in the Bolan Pass, South Afghanistan, at Chaman, and on the Khojuk.

The flower buds are said to be eaten as a vegetable, either raw or cooked, in Oudh. Rope is made of the fibre.

N. O. 240. CORDIACEÆ,—*SEBESTENS.* Lind.—Bal. N. O. 156.

Cordia Myxa, *Linn.*; *Roxb. Fl. Ind. i.* 590; *Brandis For. Flo.* 336. *Smooth-leaved Cordia.*

Linn. Syst. *Pentandria Monogynia.*

The bark, and dried fruit.

Vernacular—Bhokur, *Dec.*; Lussora, *Hind.*, *Sind*; Sepisthan, *Arab.*, *Pers.*

A tree from 12 to 25 feet high; leaves alternate, petioled, roundish cordate, entire, repand, 3–5 nerved, 3–8 inches long; young leaves soft, pubescent; panicles terminal and lateral; flowers small, white, numerous, polygamous, pentandrous; drupe spheroidal, about an inch in diameter, smooth, yellow, and pulpy when ripe.

Common in Sind and Beloochistan, and in the Punjab Siwalick tract up to the Ravee; commonly planted in the plains and outer hills up to 3,500 or 4,000 feet. In Southern and Western India and Ceylon it is also common. Cultivated for its fruit in other parts of India, where it is not indigenous.

The astringent viscous fruit is eaten by natives, and is also employed like *Semecarpus anacardium* as an indellible ink. It was, with that of *C. latifolia*, formerly held in high repute in European practice as an emollient and demulcent, especially in affections of the lungs, and the genito-urinary organs, but both these have now fallen into disuse. The fruit of both are still, however, employed in native practice, and are met with under the names of *Lussora* (Hind.), *Gidora* (Sind), and *Bhokur*, *Buhaye* or *Lessooree*. They are also employed in Sind in the distillation of spirits, and the wood of the tree for making matches. The scabrous bark is a mild tonic, and is one of the chief remedies of the Javanese in fever cases; it is also used as a gargle in sore throats.

Cordia Rothii, *Roem. and Schultes*; *Wight Ic. t.* 1379; *Cordia angustifolia*, *Roxb. Fl. Ind. i.* 595; *Brandis For. Flo.* 338. *Narrow-leaved Sepistan.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Gondnee, *Hind.*, *Dec.*; Lyar, *Sind*; Gondnee, *Punj.*

A small tree, with slender, spreading, drooping branches; leaves nearly opposite, petioled, lanceolate, obtuse or emarginate, scabrous, pubescent beneath; petioles short, channelled; flowers small, white, numerous, in terminal corymbiform panicles, tetrandous; pedicels filiform; calyx campanulate, obscurely 4-toothed; corolla tube as long as the calyx, often longer; drupe round, very little larger than a pea, with a very little mucilaginous pulp.

Common in Sind, Cutch, Arabia, Persia, Punjab, Guzerat, Deccan, Central India, and Mysore.

Although the fruit has but little pulp surrounding the seeds, it is largely eaten by natives. The wood is not altogether worthless. It is used as fuel in the Punjab and for building in Sind; in the Deccan and Guzerat for making carriage poles, picture frames, &c. Weighs 45 lbs. per cubic foot. Sp. gr. ·720.

The bark is used medicinally, and the seeds, with those of another species, sold in the bazaars under the name of *Chakoon-ka-beej*, are employed as a specific for ring-worms.—(*Graham, Ainslie, Pharm. of Ind.*, *Brandis, Dr. Stewart.*)

Cordia latifolia, *Roxb. Fl. Ind. i.* 590. *Broad-leaved Sepistan.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Geedooree, *Sind*; Vurgoond, *Guz.*; Bhokur, *Dec.*; Burra Lussora, *Hind.*; Bootrasi, *Beng.*

A tree 15–25 feet high with spreading drooping branches; leaves alternate, petioled, round-cordate, entire, repand, 3–5 nerved,

smooth above, scabrous beneath, 5–6 inches long; flowers white, small, numerous, in short terminal and lateral panicles; calyx villous, campanulate, mouth unequally toothed; corolla campanulate; tube shorter than calyx; drupe 1–1½ in. diameter, yellow, pulpy, 1-seeded.

Indigenous in Sind, Punjab, Guzerat, Deccan, Bengal.

The unripe drupes are pickled, and also consumed as a vegetable by the natives of the Deccan and Guzerat. The ripe drupes are eaten largely. Wood tough, and used for making charpoys, door frames, &c. in Sind. Weight 47 lbs. per cubic ft. Sp. gr. ·782.

N. O. 241. CONVOLVULACEÆ,—*BINDWEEDS.* Lind.—Bal. N. O. 154.

Convolvulus scammonia, *Linn.* *Scammony Plant.*

Linn. Syst. *Pentandria Monogynia.*

The Gum Resin.

Vernacular—Sugmoonia, *Hind.*, *Sind*, *Arab.*, *Pers.*

A climbing perennial, native of Syria, Asia Minor and Greece. Cultivated in some parts of India. It affords the gum resin (scammony), which has been employed in medicine from very ancient times. Theophrastus was acquainted with it, and it was likewise familiar to Dioscorides, Pliny, and Celsus. The true and unadulterated scammony, called Virgin Scammony, is the milky juice of the long, thick roots obtained by cutting the top obliquely off, and allowing the juice to exude into suitable receptacles, and then drying. It was formerly distinguished by the names of Aleppo and Smyrna Scammony. The latter is now chiefly employed in medical practice, owing to the former, which once was the more costly, having lost its pre-eminence.

Scammony, as met with in commerce, occurs in shapeless masses of a grey color, rough externally; fracture conchoidal, and when fresh, displaying a glistening resinous lustre of a pale color, soon passing to a dark greenish black, somewhat transparent, of sp. gr. 1·235; odour faint but peculiar; flavor cheese-like. It consists chiefly of a resin sometimes in the form of *glucoside*, sometimes in part as a resinous acid; the latter is soluble in ammonia. The resin is prepared by exhausting the root by maceration and percolation with rectified spirits. It has a feeble scammony odour and taste, and a dirty greenish-brown color; but when purified, is of a pale wine yellow, and free both from taste and smell. Its powder forms with milk a fine emulsion.

Scammony is an efficacious and powerful cathartic, operating quickly. It is very eligible in worm cases (except when there is a copious mucuous secretion) and in the disordered state of the bowels which so commonly occurs in children. It is particularly indicated in cases of dropsy, torpor of the intestines, hypochondriasis, and mania. It is seldom prescribed alone, but is generally ordered in combination with other purgatives. It has been by some authors considered as an irritating and unsafe medicine, but this Dr. Thompson appears to think is only in inflamed states of the bowels; in which cases Dr. Paris states he administered the purgative in a mucilaginous draught or emulsion.—(*Royle, Duncan, Edin. Disp., Ainslie, Garrod, Loudon, Pharm., Pharm. of India, Nevin's Pharm, Paris's Pharmacologia.*)

Convolvulus arvensis, *W.*; *Convolvulus Malcolmi Roxb. Fl. Ind. i.* 474. *Small Bindweed or Deer's-foot Convolvulus.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Hiran-paddee, *Punj.*, *Hind.*, Hirn-pug; *Sind.*

A perennial; stem and branchlets twining to an extent of 6 or 8 feet, furrowed and twisted; leaves 1–3 inches long, petioled, sagitate, with large angular auricles, margins a little hairy, peduncles axillary, 1–2 flowered; flowers pink.

Abundant in Sind, Persia, the plains of the Punjab and the Himalaya to 10,000 feet. Common on the black soil of the Deccan; flowers during the rains. The roots are sometimes used by the Sindees as jalap. Almost all species of this genus have roots which possess to a small extent cathartic properties. Of those indigenous in Sind are *C. forskahlli* (Del.), *C. microphyllus* (Sieb.), *C. capitatus* (Vahl.), and *C. rhynchospermum* (Hochst.), and, of the same N. O., *Ipomœa reptans* (W.), (*Naro*, Sind; *Ganthiun*, Punj.) the stems and leaves of which are eaten as vegetable. *Ipomœa pescapræ*, Goat's-foot creeper, (Chagulkoon, Hind.; Dho-puthee lutta Doodhlatta, Sind) a creeping perennial with long-petioled, smooth, bi-lobed leaves, not unlike *Bauhinia* and reddish purple flowers. The leaves of this plant are applied externally as an anodyne in colic. *Ipomoea pes-tigridis* (Por-buthul, kunra, Hind.), a species with large palmate leaves and hairy stems, bearing white flowers, tinged with purple. The powder of the roots of *Ipomoea turpethum* (R. Brown) (Turbid Teoree, Hind.; Chita Bansa, Punj.) was once held in high repute in India as a purgative, and is now considered beneficial in diseases of the mucuous membrane, and in leprosy and paralysis. Roxburgh gives a full account of its properties and uses in accordance with the views of Wallich, Glass, Gordon and others, but it has fallen into disuse in European practice. Sir W. O'Shaughnessy found it so uncertain in its operation, that he pronounced it unworthy of a place in the Pharmacopœa. The leaves and stems of the plant are considered demulcent and laxative. *Calonyction muricatum* is also abundant in Sind, and the *Batatas edulis* (Ruttaloo Sukkurkund, Hind.; Gajar Lahoree, Sind) the sweet potato, so familiar to every one as an important article of food, is cultivated to a great extent. —(*Roxb., Brandis, Graham, Dr. Stewart, Pharm. of Ind.*)

Rivea hypocrateriformis, *Choisy in DC. Prod ix.* 326; *Argyreia uniflora; Roxb. Fl. Ind. i.* 495.

Linn Syst. *Pentandria Monogynia.*

A twining woody perennial; leaves petioled, reniform, broad cordate or obtuse, underside downy; petioles as long as the leaves, with two glands; flowers peduncled, 1–3, white, large; peduncles axillary, solitary; bracts 2, deciduous; corolla tube long, slender, cylindric.

Sind, Beloochistan, Punjab, South and Central India, the Deccan and Guzerat.

Lettsomia nervosa, *Roxb. Fl. Ind. i.* 488; *Argyreia speciosa, Choisy; DC. Prod.* 328. *Elephant Creeper.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Summundur Sok, *Hind., Sind*; Googulee, *Dec.*; Bichtarik, *Beng.*

A woody twining tomentose perennial, running over high trees; leaves petioled, large, broad-cordate, acuminate, nerved, glabrous above, underside thickly tomentose, with much velvetty hair; petioles as long, or a little longer, than the leaves; flowers large, in axillary peduncles of a deep rose color; peduncles many flowered, longer than petiole; bracts many, large, ovate, deciduous; sepals 5; corolla campanulate; tube nearly 2 inches long; stigma 2; berry globose, smooth, entire.

Found in Sind, Arabia, Punjab, South, N. W. and Central India, Bengal, Deccan, and Guzerat, Kutch and the Malabar Coast.

The leaves of this plant act very efficiently as a discutient and maturant. It is also said to possess virtues in cutaneous affections, if rubbed in freely.—(*Ainslie, Pharm. of Ind., Graham.*)

Pharbitis nil, *Choisy*; *DC. Prod.* 329; *Ipomœa cærulea, Roxb. Fl. Ind. i.* 501. *Pale Blue Ipomœa.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Neelkulmee, *Beng.*; Kala Dhana, *Hind.*; Phaproo Sag, Kirpawa, *Punj.*; Hub-ul-nil, *Sind, Arab.*

A twining annual, with round hairy stems; cordate, 3-lobed and downy leaves, which are alternate, and 2–4 inches long; peduncles axillary, 2–4 flowered, longer than the petioles; sepals ovate-lanceolate, hispid; flowers large, of a lovely pale blue.

The *Campana Azurea* of the Italians and *Convolvulus celestis* of Forster.

Abundant in Sind, the Punjab, Siwalik tract, and outer hills occasionally to 5,000 feet, up to near the Indus. Common in Bombay and throughout the Concan and Guzerat, also in North, South, East and Central India.

The black angular seeds (*Kala-Dhana*) are a quarter of an inch or more in length, having the form of the segments of an orange of a sweetish and subsequently rather acrid taste; much prized by the natives as an effectual, safe, and quick operating purgative, when administered in a convenient vehicle, in powder, after roasting. In properties and uses it resembles the officinal jalap, for which it is an excellent substitute, and though not superior in quick action, is in portability and flavour, besides being inexpensive. By exhausting the seeds dried at 100°C. with boiling ether Firminger and Hanbury obtained a thick light brownish oil, having an acrid taste, and concreting below 18°C. The powdered seeds yielded of this oil 14·4 per cent. The mucilaginous properties which it contains are removed by water, together with some albuminous matter, and a little tannic acid.

The active principle the seeds contain, is a resin (*Pharbitisin*) introduced into practice by Dr. Bidie. It is brown in the mass, but becomes grey when powdered; has a peculiar sweetish but rather disagreeable odour; tastes like the seeds, but is very nauseous and persistent, exciting salivation and irritation of the fauces. The resinous juice of *P. cathartica* in the Antilles is also used as a purgative.—(*Graham, Roxb., Dr. Stewart, Lindley, Pharm.*)

N. O. 242. CUSCUTACEÆ,—*DODDERS.* Lind.—Bal. N. O. 155.

Cuscuta reflexa, *Roxb. Fl. Ind. i.* 447; *DC. Prod. ix.* 454.

Linn. Syst. *Tetrandria Digynia.*

Vernacular—Huldee-algoosce-lutta, *Beng.*; Zarbootee, Banowsha Nirathar, *Punj.* The seeds Aftimoon, Akasbel, Kasus, *Hind., Sind, Punj.*; Akaspawan, Amarwel, *Dec.*

Parasitical; stem filiform, succulent, twining, ramous, smooth, leafless, yellow; flowers white, short-pedicelled, racemose; racemes numerous; sepals 5, acute, ovate-oblong; corolla tubular; styles short, stigmas 2; capsule baccate.

Occurs in Sind, Deccan, Concan, Kutch, N. W. Provinces, the Punjab, and nearly throughout India. In the Punjab it occurs on the plains on *Zizyphus* trees, also on *Adhatoda vessica, Dalbergia,* and more rarely on *Populus Euphratica,* or *Ficus caricoides.*

On the Punjab Hills it appears to grow up to 9,000 feet on *Spiræa, Sambucus, Indigofera, Carduus,* &c. In Sind and Afghanistan on *Zizyphus, Alhagi, Nepeta,* and *Populus*; in Mahableshwur on the *Eugenia Jambolana,* and in Guzerat on hedges and bushes by the road side. Griffith speaks of a gigantic species in Afghanistan, which even preys upon itself. One of its masses, he says, half covered a willow tree 20 to 30 feet high. The foliage of these parasites is said to be acrid, and to have been formerly used as a purgative. In various parts of the Punjab, and in Sind also, the

seeds are used as a carminative; bruised, they are used for washing the hair; or as an anodyne, bruised and burned. As a depurative they are administered in cold infusion. In the Punjab they constitute part at least of the *Kasus* of drugsellers given as a depurative chologogue. The seeds are said by the native practitioners in Sind to be particularly useful in excessive bile, and, with sarsaparilla, for purifying the blood. Edgeworth mentions that the hill tribes of the Punjab believe that crows pluck sprigs of this and *C. anguina* and drop them into water, when they become snakes, and so furnish them with food. The possession of its roots is said to confer the gift of invisibility, and the natives promise boundless wealth to him who finds them.—(*Lindley, Loudon, Roxb., Graham, Dr. Stewart, Cleghorn Punj. Rep.*)

Cuscuta chinensis, *DC. Prod.* 457; *C. sulcata, Roxb. Fl. Ind. i.* 447.

Vernacular—Akasbel, *Sind, Hind.*

Stem filiform, succulent, yellow; leaves few; flowers fascicled, minute, white, sessile or subsessile; sepals 5, ribbed; corolla reflexed; capsule 2-celled.

Sind, Kutch, Punjab, Deccan, Concan, and nearly throughout India.

ALLIANCE 47. *CORTUSALES.*

N. O. 245. PLUMBAGINACEÆ,—*LEADWORTS.* Lind.—Bal. 167.

Plumbago rosea, *Linn.*; *Roxb. Fl. Ind. i.* 463.

Linn. Syst. *Pentandria Monogynia.*

The root and plant.

Vernacular—Rukta-chitra, Lal-chitra, *Hind.*; Chittermool, *Arab.*

This shrubby perennial is a native of India, and is found cultivated in gardens. The roots (*Radix vesicatoria* of Rumphius), sliced and applied to the skin, produce blisters, but less rapidly and effectually than *Cantharides.* Besides Rumphius, Burman and other old writers noticed the vesicant properties of this plant; but Sir W. O'Shaughnessy was the first to institute a series of trials. As a result of clinical observation in between three and four hundred cases, he states that he found the root bark rubbed into a paste with water and a little flour, and applied to the skin, occasioned pain in about 5 minutes, which increased in severity, till in a quarter of an hour it was equal to that of an ordinary blister It is regarded as a cheap substitute for cantharides, possessing the additional advantage of not causing irritation of the genito-urinary organs. The results of Dr Waring's trials were far less satisfactory. The pain occasioned was often much greater than that of an ordinary blister, while the resulting vessication was far from uniform in extent and rapidity of healing. It is an acrid stimulant taken internally, and an acro-narcotic poison in large doses, in which character it is often employed by the people of Bengal. It is a common practice of the natives almost all over India, in order to harm a person against whom they have an animus, and who may have cattle, to introduce a quantity of the bruised root into the os-uteri of cows, thus causing death. The lower castes (Chumbars and Mhars), when in want of animal food, also adopt this practice. In Sind, the Punjab, Madras, and other places in India, it is used to cause abortion by insertion into the uterus. As a cure for toothache it is prized by the Javanese as a topical application, and also in some cases of syphilis and leprosy. The leaves ground up and made into a plaster, are said to be good in buboes and abscesses. *Plumbago Europea*, according to Virey, is employed by the poor to produce ulcers on the body to excite pity, and was at one time used in the cure of itch; the roots are so acrid that they are applied to make issues, and even as vesicants, causing, however, much pain. Administered internally the root is said to be as effectual an emetic as ipecacuanha.—(*Lindley, Loudon, Pharm., Ainslie, Dr. Stewart.*)

Statice ægyptiaca, *Delisle*; *Bot. Mag.* 2363. *Egyptian Sea Lavender.*

Linn. Syst. *Pentandria Polygynia.*

A small shrub with radical, alternately pinnatifid, sinuated leaves; intermediate segments of corolla linear; flowers white.

Common in Sind, Afghanistan, Beloochistan, and Egypt. Leaves used in native practice as a febrifuge, and in diarrhœa.

Statice spathulata, *Desf. Bot. Mag.* 1617. *Spatula-leaved Sea Lavender.*

Linn. Syst. *Pentandria Polygynia.*

A small shrub 1–1½ feet high, found in dry stony places; leaves radical, spatulate, obtuse, glaucous, entire, on long stalks; scape rounded; flowers purple, racemose, 1-sided.

Sind and Beloochistan.

N. O. 246. PLANTAGINACEÆ,—*RIBWORTS.* Lind.—Bal. 168.

Plantago isphagula, *Roxb. Fl. Ind. i.* 404.

Linn. Syst. *Tetrandria Monogynia.*

The seed—Spogel Seed.

Vernacular—Ispaghool, *Pers.*; Spungar, *Sind*; Isubghole, *Hind.*; Bazaar-ka-toona, *Arab.*

This is an erect annual, generally rising to about a foot in height; stem caulescent; leaves alternate linear-lanceolate, three-nerved, slightly glabrous, stem-clasping, 6–8 in. long; peduncles the length of the leaves, axillary, solitary, rather villous; flower-spikes cylindric, or reduced to a globular head; bracts 1-flowered; calyx 4-leaved, with membraneous margins; flowers numerous, small, white.

Occurs in Sind, Beloochistan, Afghanistan, Arabia, Egypt, and N. W. India. Edgeworth states it is cultivated at Mooltan, and Dr. Stewart says he has never seen it cultivated in the Punjab, but understands it to be grown sparingly at Lahore. The seeds yield to water an abundance of rich mucilage, which is used by the natives, with sugarcandy, as a cooling demulcent drink, and is often prescribed where emollients are required. Of late years it has also been prescribed in European practice in diarrhœa, dysentery, gonorrhœa, catarrh, and nephritic affections. It is said that a slight degree of astringency and some tonic property may be imparted to the seeds by exposing them to a moderate degree of heat, so as to dry and slightly brown them. The seeds of *Plantago psyllium* possess nearly the same properties, as also those of *P. coronopsis.*—(*Roxb., Ainslie, Dr. Stewart, Pharm. of Ind.*)

N. O. 248. MYRSINACEÆ,—*ARDISIADS.* Lind.—Bal. 136.

Embelia ribes, *Burm. Wight, Icon. t.* 1207; *Roxb. Fl. Ind. i.* 586.

Linn. Syst. *Pentandria Monogynia.*

The berries.

Vernacular—Wawrung, *Hind.*; Babrung, Bachirung, *Punj.*; Umbelia, *Ceylon.*

A large scandent shrub, common in South, West, and N. W. India and Ceylon. The berries are used as an anthelmintic for intestinal worms. The natives of the hills

in the vicinity of Sylhet, where the plant grows abundantly, gather them, and when dry dispose of them to traders in black pepper, who fraudulently mix them with that spice, which they so much resemble as to render it almost impossible to distinguish them by sight They are considered in the Deccan as a specific for rheumatism. In piles a decoction is said to prove serviceable. Cathartic properties are also ascribed to them, and to the berries of *E. robusta* and *Myrsine bifaria*.—(*Roxb., Lindley, Dr. Stewart*)

Ægiceras fragrans, *Don.*

Linn. Syst *Monadelphia Pentandria.*

Vernacular—Chawer, *Sind*; Hulsee, *Hind.*

A large shrub or small tree; leaves alternate, short-petioled, obovate, smooth, firm, and fleshy; flowers white, fragrant, on terminal umbels; capsule horn-shaped, pointed, one-valved.

The generic name from *Aix* a goat, and *Keras* a horn, in allusion to the form of the fruit. Abundant in salt marshes in lower Sind and the Delta of the Ganges, Tenasserim Provinces, and Java.

Reptonia buxifolia, *A. D.*; *Edgeworthia buxifolia, Falc. Trans. Linn. Socy. xix. t.* 9; *Brandis For. Fl.* 288.

Linn. Syst. *Hexandria Monogynia.*

Vernacular—Gurgura, *Punj.*; Garar, *Afg.*; Gharatee, *Sind.*

A large evergreen shrub, with axillary spines and spinescent branches; leaves entire, oblong, ovate, coriaceous, hoary beneath; flowers white, or greenish yellow, sessile, minute, clustered; calyx 5-lobed; corolla with a short tube and 5 spreading lobes in the bud; drupe globose, sessile, succulent.

Common in Sind, Beloochistan, Afghanistan, Punjab, and Arabia. The fruit is eaten by the natives of Sind and Afghanistan; and according to Griffith, is considered heating by the Afghans.

ALLIANCE 48. *ECHIALES.*

N. O. 249. JASMINACEÆ,—*JASMINWORTS.* Lind.—Bal. 137.

Nyctanthes arbortristis, *W.* *Square-stalked Nyctanthes.*

Linn Syst. *Diandria Monogynia.*

The flowers.

Vernacular—Hursinghar, *Hind.*; Pharbutty, *Dec.*; Koree-parijat, Lakuri, *Punj.*; Singahar, *Beng.*

The plant under notice is a very common ornamental shrub in gardens, and about villages in the Western, Northern, North-eastern and Southern Presidencies. The genuine essential oil of jasmine of the shops is obtained from the flowers of *J. officinale* and *J. grandiflorum* (chumbalee), but a similar perfume is also procured from the flowers of *J. sambac* (Bhut Mogra), which, in India, are used as votive offerings, and are reported to possess considerable power as a lactifuge. Mr. Wood speaks of them as effectual in arresting the secretion of milk in the puerperal state, in cases of threatened abscess. The bitter root of *J. angustifolium*, ground small and mixed with powdered *Acorus calamus* root, is considered in India as a valuable external application in cases of ringworm. The bitter leaves of *J. floribunda* have a very powerful anthelmintic action, and are employed in Abyssinia in cases of tapeworm.—(*Lindley, Roxb., Graham, Pharm. of India, Dr. Stewart, A. Richard.*) The various varieties of the jasmine tribe are familiar in gardens all over the world, and pertain to the province of the florist.

N. O. 250. SALVADORACEÆ,—*SALVADORADS.* Lind.—Bal. 139.

Salvadora persica, *Linn.*; *Roxb. Fl. Ind. i.* 389; *Wight Ic.* 1621. *The Mustard Tree of Scripture.*

Linn. Syst. *Tetrandria Monogynia.*

The seed of the fruit, and bark.

Vernacular—Jhal, Arak, Kourijal, *Punj.*; Peeloo, *Sind.* The tree, Kubbur.

A large evergreen shrub, 10–15 feet high; branches numerous, spreading, white; branchlets drooping; leaves oblong or oval, opposite, petioled, smooth, polished; flowers very small, greenish white, tetramerous; fruit minute, globular, red when ripe, supported by the persistent calyx.

This is supposed to be the "*mustard tree*" of Scripture. Common in lower Sind and Beloochistan, the Punjab, Kutch, Concans, and Deccan; also the Circars near the sea. In Sind it grows to a larger size than in any of its other habitats. The berries have a strong aromatic smell and taste, not unlike garden cress. The twigs are used as tooth-brushes (Miswak) by natives of Sind, and the bark as a tonic and stimulant also in fevers. The acrid bark of the root, when fresh bruised, is employed as a vesicant, and as a stimulant it promises to be of value in medicine.

In Dr. Imlach's report on snakebites in Sind several cases are mentioned in which the fruit of this tree, which is much relished by the natives, were administered internally with good effect. Even at the present day native practitioners use it for this purpose. The dried fruits, though they lose much of their efficacy, are also employed by native practitioners, but in much larger doses, and with the addition of about half a grain of *Nowsagur* (borax). They are said to be also purgative. As a stimulant Roxburgh considers that the root bark promises to be a valuable medicine, an opinion fully endorsed by Dr. Gibson.—(*Roxburgh, Graham, Lindley, Pharm. of Ind., Dr. Stewart, Ainslie, Bombay Med. Phys. Trans.*)

Salvadora oleoides, *Dne. Jacq. Voy. Bot. t.* 144; *S. Indica, Royle Ill. p.* 319; *Brandis For. Flo.* 316.

Linn. Syst. *Tetrandria Monogynia.*

Vernacular—Kubbur, Diar, Jhal, *Sind, N. W. P., Punj.*

A shrub or small tree with stiff, ash-colored branches and branchlets; leaves glaucous, ovate-lanceolate, coriaceous, fleshy, nerved; lateral nerves often indistinct; flowers greenish white, sessile in compact, erect, axillary panicles, shorter than leaves; calyx cup-shaped, divided midway into 4 rounded lobes; corolla as long or longer than calyx; fruit globose, minute, yellow when ripe, supported by the persistent calyx.

Abundant in Sind, associated with *S. persica*; also in the Punjab. The root bark is used as a vesicant and is employed as that of *S. persica* is. Fruit rather more acrid.

N. O. 251. EHRETIACEÆ,—*EHRETIADS.* Lind.—Bal. N. O. 154.

Coldenia procumbens, *Linn.* *Trailing Coldenia.*

Linn. Syst. *Tetrandria Digynia.*

Vernacular—Tripungkee, *Hind.*; Tripakshee, *Sans.*; Bursha, *Sind.*

A small procumbent annual, the only species of the genus; leaves alternate, short, wedge-shaped, deeply crenate, stalked shorter

on one side, glaucous; calyx 4-leaved; corolla pale blue, often white, infundibulliform; fruit 4-celled, enclosed in the calyx, with a single seed in each cell.

Indigenous in Sind, Bengal, and S. India; also in the Western Presidency, and in the Concans and Deccan in rice fields.

The fresh leaves are used medicinally in Sind, ground up and applied to rheumatic swellings. In Behar, the plant dried, and powdered fine with *Fœnugreek* seeds, is applied as a poultice to boils to hasten suppuration.

The leaves of *H. strigosum* are used with tobacco-seed oil in the cure of snakebites. —(*Roxb., Ainslie, Graham, Dr. Stewart, Dr. Stocks, Brandis.*)

Heliotropium Europæum, *Linn.* *European Turnsole.*

Linn. Syst. *Pentandria Monogynia.*

The leaves.

Vernacular—Poput-bootee, Geedur-tamakoo, *Sind, Punj.*

An annual; stem diffuse, ramous; leaves alternate, petioled, ovate, entire, rugose, tomentose; spikes in pairs; flowers in two rows, sessile, minute; corolla longer than calyx.

This is one of the few European plants found in Sind. The leaves, boiled in a little castor oil, are said to relieve the pain of scorpion bite or bee stings; also the bite of a mad dog. For cleansing and healing ulcers they have also been found of service.

Heliotropium supinum, *L.* *Trailing Turnsole.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Wudda-soorec, *Sind.*

A deciduous trailing annual; stem shrubby; leaves ovate, tomentose, alternate, petioled, plaited; spikes solitary and in pairs; flowers white.

Sind, Punjab, and the borders of Beloochistan. Fresh leaves used as a depurative.

Ehretia obtusifolia, *Hochst.*; *DC. Prod. ix.* 507; *Brandis For. Fl.* 340. *Obtuse-leaved Ehretia.*

Linn. Syst. *Pentandria Monogynia.*

A small tree, with greyish green branches; leaves simple, alternate, spatulate, obovate, entire, 1–2 in. long, rough, pubescent; flowers pedicillate, ¼ in. long, in short, lax, hairy cymes; pedicels as long as calyx, or longer; calyx lobes lanceolate; corolla campanulate, twice the length of calyx; lobes ovate; drupe ¼ inch, with 4, one-seeded pyrenes.

Upper Sind and Punjab. Found also in lower Sind, but the plants do not appear to attain the same degree of perfection.

The root, taken up fresh, is employed by natives, drunk in the form of tea, for cleansing the system in venereal diseases of long standing.

Ehretia lævis, *Roxb. Fl. Ind. i.* 597; *Wight. Ic. Pl. t.* 1382; *Brandis For. Fl.* 340; *var floribunda, Royle, iii. p.* 306.

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Chamror, Chumbul, *Hind., Sind.*

A middle-sized tree, covered with harsh pubescence; branches erect, numerous; bark ash-colored; leaves alternate, short-

petioled, membraneous or coriaceous, entire, oval, acuminate, softly pubescent and ciliate in young trees, 3–6 in. long; main lateral nerves 6–10 on either side of midrib; flowers small, white, in terminal or axillary cymes, composed of thin, recurved, dichotomous secund spikes; bracts none; calyx and corolla as in the last; drupe 2-lobed, with a four-partible nut.

Upper Sind, Trans-Indus, Punjab and Central India, also Guzerat and the Concan.

The inner bark is eaten ground and mixed with flour in times of scarcity. The fruit is also said to be edible, and according to Edgeworth the timber is valued for its hardness.—(*Brandis, Dr. Stewart.*)

N. O. 253. BORAGINACEÆ,—*BORAGEWORTS.* Lind.—Bal. N. O. 154.

Onosma echioides,

Linn. Syst. *Pentandria Monogynia.*

The dried plant and flowers.

Vernacular—Ruthunjote. The flowers—Gool gauzaban.

An annual with lanceolate leaves, covered with erect hairs; stems hispid, much branched; flowers white; anthers as long as the filaments.

Abundant in Sind, the Punjab, and the Himalaya to 10,000 feet.

This plant possesses the same properties as the following:—*Trichodesma indicum,* (*Ratmandoo*) *Heliotropium ophioglossum, Heliophytum erosum, Fagonia mysurensis,* and the leaves of a species of *Olea,* all indigenous in Sind, and enumerated by Dr. Stocks as being supposed to possess cooling properties, and, according to the Arabian system of medicine, good against all disorders arising from heat (external or internal). They are much used as preventives in the hot weather, to keep the system cool and ward off disorders incidental to the season. The first three are the plants which constitute the *Gauzaban* of the bazaars The leaves of *Onosma bracteatum* are used in the Deccan for making emollient poultices, and with several species of *Trichodesma* are employed by natives of Sind in snake-bites, but their virtues in this character are questionable. The roots of *O. emodi* make an excellent dye for wools and silks.—(*Dr. Stocks, Dr. Stewart.*)

Trichodesma africanum, *R. Br. Prod. p.* 495.

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Paburpanee, *Sind.*

Annual; 8-12 inches high, with an erect, hirsute stem; branches spreading; leaves opposite, petioled, ovate, covered with stiff bristles; leaflets alternate; peduncles many flowered; flowers blue; sepals erect, ovate, acute.

Sind, Beloochistan, Bengal, and the Malabar Coast. Leaves used as a diuretic.

Trichodesma indicum, *R. Br. Prod. p.* 496; *Borago Indica, Linn.; Pluk. Alm. t.* 76. *Indian Trichodesma.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Chota-kulpha, *Hind.*; Kowri-bootee, Ratmandoo, *Punj.*; Gaozaban, *Sind.*

A diffuse annual; 8–16 inches high; stem very small, villous; leaves scabrous, stem-clasping, lanceolate or sub-sagittate;

upper ones alternate, sessile; lower ones opposite; peduncles one-flowered; flowers pale blue, drooping; calyx villous, pentapartite; sepals auriculated at the base; corolla rotate.

Occurs in Sind, Beloochistan, Punjab plains, and on the hills to 4,500 feet; also in the Deccan, Guzerat, Bengal, the Malabar Coast, and Southern India.

This plant is held in high repute by the natives of Sind, the Deccan, and Southern India in the cure of snakebites. It is also considered diuretic. In the Punjab it is used for purifying the blood; also as a cooling medicine. Its leaves are officinal, under the name of *Ratmandoo*; a cold infusion being considered depurative. In the Deccan it is used as an emollient poultice.—(*Pharm. of Ind., Dr. Stewart.*)

Arnebia echioides, *DC.*

Linn. Syst. *Pentandria Monogynia.*

Vernacular—Arnub, *Arab.*; Harnoob, *Sind.*

An evergreen herbaceous perennial, with sessile, hirsute, oblong-ovate leaves; flowers yellow, in terminal spikes; bracts foliaceous; calyx 5-parted; corolla funnel-shaped; nuts 4; truncate.

Sind, Egypt, Arabia, and probably Kutch and Rajpootana.

N. O. 255. LAMIACEÆ,—*LABIATES.* Lind.—Bal. N. O. 161.

Ocimum basilicum, *Linn.*; *Wight, Icones. t.* 868. *Common Sweet Basil.*

Linn. Syst. *Didynamia Angiospermia.*

The dried herb and seed.

Vernacular—Kalee-Toolsee, *Hind.*, Munjarikee, *Sans.*; Subjah, *Dec.*; Babooee-toolsee, *Beng.*; Buklut-ul-zab, *Arab.*; Tooreh-Korasanee, Debanshah, *Pers.*; Nazbo, *Sind*; Furrunj-mooshk, Nigand, Babree, *Punj.*

An erect herbaceous annual, rising to 3 or 4 feet, with petiolate, ovate-oblong, serrate and smooth leaves; petioles ciliate; racemes simple; calyces longer than pedicels; whorls 6-10 flowered; flowers white, fragrant.

Indigenous in Persia and Sind. Growing throughout India; and of which there are several varieties, viz., *O. pilosum, hispidum ciliatum, thrysiflorum* and *glabratum.* They are all aromatic and fragrant plants. Their seeds contain a quantity of mucilage, and being considered of a cooling nature, are prescribed in infusion, in gonorrhœa, diarrhœa, and chronic dysentery, also in the after-pains of parturition by Hindoo women.—(*Dr. Fleming.*)

The dried leaves powdered are said to be an effectual means of dislodging maggots. (Dr. Newton.) The expressed juice forms one of the ingredients of a celebrated and rather effectual nostrum for the cure of ringworm. The seeds of *Salvia plebeia*, R. Br. (Summundur Sok, Sind) and *Salvia pumilla*, Linn., both indigenous in Sind, are used as demulcent in gonorrhœa, diarrhœa, and hæmorrhoids. The following indigenous labiates are also used medicinally, and some in the culinary art:—*Prunella vulgaris*, Linn. (Oostookoodoos, Sind), *Lavendula Stœchas*, W., also called Oostookoodoos, as expectorants. *Mentha arvensis*, the marsh whorled mint and *Mentha viridis* (Poodina, Pfoodna, Sind) are prized in dyspeptic complaints; from the latter an essential oil is distilled, and prescribed in cholera. *Origanum marjorana* (Murwo, Sind) is eaten with *Cleome pentaphylla* (Hool Hool, Sind) as a remedy for colic. An essential oil is also distilled from the first and used as a perfume; also in hot fomenta-

tions to the stomach of children in acute diarrhœa. The Labiates in general are considered destitute of any deleterious secretions. They are for the most part fragrant and aromatic; and are used either as flavorings in the *cuisine* or as perfumes and agreeable tonics and stimulants. Some yield a substance resembling camphor, as *Rosmarianus officinalis*. A strong decoction of the leaves of *Rosmarianus officinalis* is employed to allay the heat of the skin in erysipelas, and has also been employed as a cephalic medicine, relieving headaches and exciting the mind to vigorous action. It is also remarkable for its undoubted power of encouraging the growth of hair and curing baldness. *Nepeta ciliaris* (Joofa, Sind) is given in sherbets as a remedy in coughs, and is said to be a very agreeable drink to persons suffering from fevers. *Melissa officinalis, Mentha piperita et pulegium* are other herbs sold in the bazaars, and used as stomachics, *M. piperita* and *pulegium* being considered good expectorants. The seeds of *Dracocephalum Royleana* are held in high repute in native medicine as a mucilaginous drink, being cooling and demulcent.—(*Roxb., Lindley, Loudon, Graham, Dr Stewart, Ainslie, Duncan's Edin Disp., Dr. Stocks, Pharm. of Ind., Agri-Hort. Rept. Punj*)

N. O. 256. VERBENACEÆ,—*VERBENES*. Lind.—Bal. N. O. 162.

Clerodendron phlomoides, *Roxb. Fl. Ind. iii.* 57; *Volkameria multiflora, Burm.* *Phlomis-like Clerodendron.*

Linn. Syst. *Didynamia Angiospermia.*

Vernacular—Heerun, Urnee, *Hind.*; Gharayt, *Sind.*

An arborcous shrub; 6–10 feet high, with greyish branches, and opposite, petioled, ovate-cordate, dentate, and downy leaves; flowers white, numerous, fragrant; peduncles axillary, generally tripartite; fruit 4-lobed, 1 seed in each cell.

Occurs in Sind, the Punjab, Deccan, Coromandel, Bengal, Behar, Lower Kamaon, and Ceylon.

There are two varieties of this shrub; the second is distinguished by the color of the flowers, which are red instead of white.

The bitterish juice of the leaves of the white flowered variety—the plant under notice—is considered by natives a good alterative. It is prescribed in obstinate pains, which often attend neglected syphillis; also as a remedy for itch; in this last character it is much used in Sind. The roots of *Clerodendron serratum* (Barungee, Dec.), a species indigenous in the Deccan and Travancore, are used in the latter place in febrile and catarrhal affections, and the seeds in dropsy, being given in infusion. The leaves of *Clerodendron importunatum* (Bhutt) (South and Central India, and Deccan) are said to be used as a cheap and efficient substitute for chiretta, as a tonic and antiperiodic.—(*Roxb., Graham, Ainslie, Brandis, Pharm of Ind.*)

Lantana indica, *Roxb. Fl. Ind. iii.* 90.

Linn Syst. *Didynamia Angiospermia.*

A shrubby erect plant; stems 4-sided, hairy, of a dark purple color; leaves opposite, ovate, narrowed into the stalk, acuminate, crenate, and pubescent; flowers in ovate heads, numerous, of a purple color; peduncles axillary; fruit globular, purple when ripe, edible; nuts turbinate, 2-celled, 1 seed in each.

Indigenous in Sind, the Deccan, Ceylon, the Himalaya, and North India.

Lantana is one of the ancient names of the Viburnum, to which the foliage of this plant bears some resemblance.

Economical uses unknown.—(*Roxb., Graham, Loudon.*)

Vitex negundo, *Linn.*; *Wight. Ic. t.* 519; *Roxb. Fl. Ind. iii.* 70.

Linn. Syst. *Didynamia Angiospermia.*

The leaves and berries.

Vernacular—Samaloo, Paynee-ka-samaloo, *Hind.*; Nirgoondee, Shambalee, *Dec.*; Banna-marwand, *Punj.*; Nishinda, *Beng.*; Bun-khow, *Hazara*; Sindooka, *Sans.*; Fenjenghist, *Arab.*

A large arboreous shrub, with an irregular trunk, about 20 inches girth; branches rather slender; leaves digitate, ternate or quinate, opposite, petioled, under side hoary with grey pubescence; leaflets entire, lanceolate; lower two sessile, larger three petioled; panicles bipartite, terminal, tapering; flowers sessile, numerous, bluish-purple.

A native of Cochin-China, Ceylon, and South India. Common in Sind, the Punjab Siwalick tract, to 3,500 feet in the outer hills, and occasionally in the Salt Range, also in Bengal and the Western Presidency.

The *Thuoc-un-rung* of the Cochin-Chinese, the *Bemnosi* of Rheede, and the *Lagondia littoreum* of Rumphius. The fruits of this plant resemble those of *V. trifolia*, and both plants appear to be possessed of similar medicinal properties. They are used indiscriminately, though *V. trifolia* is regarded as the more powerful of the two. The fresh leaves simply warmed are said to be an excellent application in rheumatism and sprains, and their efficacy in this character is well known. The dried leaves are smoked by Mahomedans in cases of headache and catarrh, and a decoction of the same (fresh or dried) is used in warm baths in the puerperal state by native women; bruised, they are applied to the temples for headache. Pillows stuffed with them and put under the head are said to remove catarrh, and its attendant headache. Under its Malayan name *Lagondee*, *V. trifolia* is highly extolled by Bontius (*Diseases of India*) as an anodyne, diuretic and emmenagogue. He testifies to the value of fomentations and baths prepared with it in Beri-beri and in the burning sensations of the feet (Ignipedis). *V. Negundo* is no less prized. Its leaves, according to Dr. Fleming, have a better claim to the title of discutient than any other vegetable remedy; it should be well warmed and applied to the affected parts, and he adds that their efficacy in dispelling inflammatory swellings of the joints from acute rheumatism, and of the testes from suppressed gonorrhœa, has often excited his surprise. In some forms of paralysis they are also said to be found of much service. The dried fruit is used as a vermifuge by natives; and according to Forskahl it is reputed at Smyrna to be a certain remedy for colic. A decoction of the root is said to be beneficial in intermittent fevers.—(*Lindley, Roxb., Graham, Dr. Stewart, Ainslie, Pharm. of Ind., Cleghorn Punj. Rep.*)

Lippia nodiflora, *Jacq.* *Knot-flowered or Purple Lippia.*

Linn. Syst. *Didynamia Angiospermia.*

Vernacular—Wukkun, *Sind*; Jalmin, *Punjab*; Goruk-moondee, *Punj.*

An evergreen undershrub, 2–3 feet high, with sessile, opposite, oblong, acute, serrate, hispid leaves, pubescent beneath, spikes roundish, conical; flowers purple; calyx 4-toothed, membraneous; corolla 4-cleft; drupe one-seeded, covered by the calyx.

Sind (upper and lower) in moist situations.

Streptium asperum, *Roxb. Fl. Ind. iii.* 91; *Priva leptostachya, Pers.* *Rough Streptium or Priva.*

Linn. Syst. *Didynamia Angiospermia.*

A herbaceous perennial, 3–4 feet high, with a woody stem; leaves

opposite petioled, cordate, serrate, hispid; peduncles solitary, hirsute; bracts solitary, one-flowered; flowers in terminal racemes, small, white; calyx 1-leaved, oblong, 5-angled.

Sind, Deccan, Bengal, and Coromandel Coast. In this last place it is called "Obeer." Occurs generally in moist localities and on old walls, &c.

N. O. 257. MYOPORACEÆ,—*MYOPORADS.* Lind. Bal. N. O.

Avicennia tomentosa, *Linn.*; *Wight Ic. t.* 1481; *Roxb. Fl. Ind. iii.* 88. *Downy-leaved Avicennia.*

Linn Syst. *Didynamia Angiospermia.*

The bark and root.

Vernacular—Byna, *Hind., Beng.*; Timmer, *Sind.*

A small tree, with opposite, short-petioled, coriaceous, obovate leaves, hoary underneath, and prominently ribbed; nerves minute, anastomising marginally; panicles trichotomous, terminal; flowers in rigid heads, of a dull yellow color; calyx 5-leaved; corolla tube short, two-lipped; capsule compressed, ovate, 2-valved.

Common in India in low places near the mouths of rivers, and in salt marshes. In the lower parts of the Delta of the Ganges it grows to a tree of considerable magnitude, and in Sind to about 25 feet. On the Bombay and Malabar Coasts it is also abundant in salt marshes, and in the Red Sea, Africa, and Burmah.

The creeping roots which often curve for about 6 feet above the mud before sticking into it, are believed by Arabian writers to possess aphrodisaic properties. Bruised and mixed with lard or butter, the unripe seeds are used as a poultice to hasten suppuration of boils, abscesses, &c. The fruit is eaten by the poorer class of natives in India. The bark is used in Rio Janeiro, as in Sind, for tanning; and the ashes of the wood for washing clothes, and by painters for mixing in colors.—(*Roxb., Graham, Lindley, Brandis, Dr. Stocks, Birdwood.*)

ALLIANCE 49. *BIGNONIALES.*

N. O. 259. PEDALIACEÆ,—*PEDALIADS.* Lind.—Bal. N. O. 147.

Pedalium murex, *W.* *Prickly-fruited Pedalium.*

Linn. Syst. *Didynamia Angiospermia.*

The fruit.

Vernacular—Burra-gokroo, *Hind., Dec.*; Gayjasoodoomstra, *Sans.*; Kussuck-kabeer, *Pers.*

This ramous, succulent annual is common in Southern and Western India, growing everywhere, but chiefly in moist localities. The fresh plant when briskly agitated in water has the singular property of rendering it very mucilaginous, without altering the taste, color or smell of the liquid; in which state, with the addition of sugar, it is prescribed by native practitioners, in dysuria and gonorrhœa; and facts communicated to the Editor of the *Pharmacopœa of India* leave little doubt that in these cases it is a remedy of considerable value; and that as a diuretic its action is speedy and marked. It is said to cure gonorrhæa without the aid of any other medicine. The prickly corky fruits met with in bazaars also possess the same properties, and in consequence, where the fresh plant is not procurable, are used instead with equal benefit. Buttermilk diluted with water is thickened with the leaves of this plant, before being offered for sale to make it look rich.—(*Roxb., Graham, Ainslie, Lindley, Pharm. of Ind.*)

Sesamum indicum, *W. Gingelly, or Indian Oily Grain.*

Linn. Syst. *Didynamia Angiospermia.*

The seeds and oil.

Vernacular—Tir, Till, *Hind.*; Taila, *Sans.*; Kounjud, *Pers.*; Semsem, *Egypt.*; Thirr, *Sind.*

This is an erect pubescent annual, indigenous, and extensively cultivated in India, Egypt, Arabia, Africa, Japan, China, Cochin-China, also in the Levant, Greece, Sicily, Malta and the West Indies. In Jamaica it was introduced by the Jews, and is now cultivated in most parts of the Island, where it is called "*Wanglo.*" In Sind it is also extensively cultivated, and forms a very large item of export.

There are two varieties of this plant under cultivation in India, the seeds of which are known in commerce as *Kullah*, or black, and *Sufaid*, or white, Till (Sesamum). Both possess the same properties, and although sold separately, the mixture is not objected to by natives, whether for food, expression of the oil, or medicinal purposes. In the last character the black seeds are believed to possess emmenagogue properties, and native women use them with (Joona Goor) old jaggery or molasses to cause abortion. In amennhorrœa either variety is eaten with benefit. As food they are parched and eaten in Africa and Arabia. In Greece cakes are made of them, and according to Sir H. Sloane, what is called the Bean or mandarin broth, is nothing else than an emulsion made of the seeds in hot water. The Jews also make cakes of them, and in many parts of India they are considered as wholesome food, but little used. They are also employed to dye a pale orange color.

"Gingelly" contains from about 40 to 50 per cent. of a fixed oil obtained by expression, for which the plant is chiefly cultivated in India This oil is used for medicinal and pharmaceutical purposes, and for burning in lamps, being equal to cocoanut oil; also for cooking by the natives and in the manufacture of soap. It has a mild agreeable taste, and scarcely any smell (sp. gr. 0·920), solidifying at 5°C., and may be kept for a very long time without becoming rancid. It is often used to adulterate almond oil. As an oil-dressing in the treatment of ulcers it is recommended by Dr. Burns, who regards it as superior to any other kind during the hot season. In the preparation of liniments it is a perfect substitute for olive oil. In fact much of the imported olive oil is only the gingelly oil made in Europe. The leaves of the plant abound with a viscid mucilage which is imparted to water; an infusion of them is used in the Southern States of North America in all affections requiring demulcents. Bruised well, they are used as an emollient poultice. The cake, or residue of the seeds, after expression of the oil, is given to cattle as food, and in the Punjab is eaten by the very poor classes.—(*Lindley, Roxb., Loudon, Cleghorn Punj. Rep., Dr. Stewart, Pharm. of Ind., Pharm., Bombay Med. Phys. Trans., Ainslie, Agri-Hort. Rep. Punj.*)

N. O. 262. BIGNONIACEÆ,—*BIGNONIADS.* Lind.—Bal. N. O. 144.

Tecoma undulata, *G Don. Roxb. Fl. Ind. iii.* 101. *Iron Wood of the Hills.*

Linn. Syst. *Didynamia Angiospermia.*

Vernacular—Rugtrora, *Hind.*; Loheera, Khew, *Sind*; Reodhan, Regdan, Lahoora, *Punj.*

A small arboreous tree 15–20 feet high, with an erect trunk; branches drooping; leaves opposite, petioled, linear-lanceolate, subcoriaceous, grey, covered with minute micaceous scales; petiole slender; flowers large, erect, orange-colored, 5–8 in lateral racemes; corolla campanulate, 5-toothed; pods linear, curved.

Common on the low hills of Sind and Beloochistan, also in the arid tracts from Delhi westward through Hurriana and the Central Punjab to the Salt Range and Trans-Indus, where it occurs to 2,500 or 3,000 feet. Edgeworth mentions it in the Punjab

Siwalick tract opposite Umballa. It is also found in Guzerat and the Deccan, and in one locality in Khandeish it is abundant. It is often grown in gardens on account of its extremely handsome and gorgeous flowers.

The bark of the young branches of this tree is employed as a remedy in syphilis.

The timber is hard and close-grained, and used in the manufacture of small furniture, spinning wheels, &c. A cubic foot weighs 44 lbs. Sp. gr. 0·704.—(*Graham, Dr. Stewart.*)

N. O. 263. ACANTHACEÆ,—*ACANTHADS.* Lind.—Bal. N. O.

Barleria longifolia, *W.*; *Asteracantha longifolia, Nees.* *Long-leaved Barleria.*

Linn. Syst. *Didynamia Angiospermia.*

The seed and root.

Vernacular—Thalibkhana, Talmakhanna, *Hind., Punj.*

A singular-looking shrubby plant, a native of the Western Coast of India, springing up in moist places, in the Deccan and Concans, Bengal, and South India. Not uncommon in the Punjab. Easily recognised by its verticelled leaves. All parts of the plant possess diuretic properties. The seeds (Thalmakhanna) are prescribed by native practitioners as such, and in the Punjab in gonorrhœa. The roots are however considered to be more effectual. Dr. Kirkpatrick states that he frequently employed them as a diuretic in dropsical cases with success. Dr. Gibson and several other medical officers also bear testimony to their value. The leaves infused in vinegar and even the ashes of the dried plant are also reckoned effective.—(*Ainslie, Graham, Pharm. of Ind., Dr. Stewart.*)

Justicia bicaliculata, *Linn.* *Malabar Justicia.*

Linn. Syst. *Diandria Monogynia.*

Vernacular—Nazpat, *Sind*; Atreelal, *Hind.*

An erect ramous annual, with a 6-sided scabrous stem; leaves opposite, short-petioled, ovato-cordate, hairy.

Generally found in waste places in Malabar, Sind, Beloochistan, Arabia, and the Deccan. According to Rheede the whole of this plant, macerated in an infusion of rice, is said to be a useful remedy in poisonous snake-bites. *Justicia repens*, a procumbent plant with sessile, lanceolate leaves also indigenous in Sind, is compared in general appearance by Miller to Basil thyme, to which its leaves also in a degree resemble in taste. The fresh leaves bruised and mixed with castor oil are used as an application for *Tinea capitis*. The flowers, leaves and roots of *Justicia adhatoda* have antispasmodic and expectorant virtues assigned them by natives, who prescribe them in coughs, asthma, ague, bronchitis, &c. The leaves and stalks of *Justicia gendarussa*, when rubbed, have a strong and not unpleasant smell, and are employed by natives in chronic rheumatism attended with swelling of the joints, also in intermittent fevers. The leaves placed among woollens will preserve them from the attacks of insects. *Justicia nasuta* is said to possess extraordinary aphrodisaical powers; the roots boiled in milk being much employed for that purpose by native practitioners. In conjunction with lemon juice it is said to be a specific for ringworm.—(*Lindley, Graham, Ainslie, Loudon.*)

Andrographis paniculata, *W.*

Linn. Syst. *Didynamia Angiospermia.*

The herb.

Vernacular—Kuriat, *Dec.*; Kalufnath, *Sind, Punj.*; Hoofar, Oosar, *Arab., Sind*; Mapa-tella, *Hind.*—King of Bitters.

This plant is indigenous in Arabia, Java, Ceylon, and some parts of India ; in others, as Tinnevelly and Travancore, it is cultivated for its stomachic and tonic properties. It has been found of much service in general debility, in the advanced stages of dysentery ; and, as a gentle aperient, in some forms of dyspepsia. The whole plant is used in medicine, and is intensely bitter, a quality which it yields to aqueous, vinous, and spirituous menstrua. In the Isle of France (Ainslie), where it is highly prized on account of its virtues, it forms the basis of a famous nostrum called *Drogue amere* (a compound of mastich, myrrh, aloes, and creyat root for which sometimes Calumba root is substituted), prescribed in cholera. In reference to its being one of the ingredients in this nostrum, Messrs. Firminger and Hanbury in their *Pharmacopæa* state that on consulting the authority (Paulino da San Bartholomeo) quoted by Ainslie, they find the bitter employed in this nostrum was *Calumba.* The expressed juice of the fresh leaves of this "King of bitters" is a common domestic remedy in the bowel complaints of children.—(*Ainslie, Pharm., Pharm. of Ind., Lindley, Graham.*)

N. O. 264. SCROPHULARIACEÆ,—*FIGWORTS or LINARIADS.* Lind.—Bal. N. O. 160.

Antirrhinum glaucum, *J. E. S.* *Grey Snapdragon.*

Linn. Syst. *Didynamia Angiospermia.*

The leaves and flowers.

Vernacular—Sonepath, *Sind.*

A perennial with numerous stems, the lower portion creeping; leaves alternate, whorled, ovate-cordate, slightly pubescent, fleshy ; upper and lower lips of the corolla white, streaked with purple veins, palate yellow.

Indigenous in Sind and Afghanistan. The leaves and flowers of this plant, dried and powdered, are snuffed up to stop hæmorrhage from the nose ; warmed with a little oil and dropped into the ear, it cures earaches. The expressed juice of the leaves, sweetened with sugar, is said to be useful in diabetes.

Of this N. O. are also indigenous in Sind *Anticharis arabica, Striga orobanchioides,* and *Linaria ramosissima,* a plant said to be of much value in diabetes, and deserving of attention.—(*Lindley, Dr. Stocks.*)

Stemodia ruderalis, *Willd. iii.* 345 ; *Roxb. Fl. Ind iii.* 95.

Linn. Syst. *Didynamia Angiospermia.*

Vernacular—Guzdur, *Sind.*

A diffuse annual, with many stems, which are herbaceous and woody; leaves opposite, petioled, ovate, and deeply serrate ; flowers axillary, solitary.

Economic uses unknown. The stems yield to water a quantity of mucilage, which might be used as a demulcent or emollient.

Peplidium humifusum, *Don.*

Linn. Syst. *Didynamia Angiospermia.*

A creeping herbaceous plant; leaves opposite, obovate ; flowers yellow, axillary, subsessile.

Common near tanks and moist localities in Sind ; in the Deccan near margins of tanks. *Æchmanthera Wallichii,* Nees, is also indigenous in Sind, from the tomentum of the leaves of which Jameson mentions that a kind of cloth is made.—(*Dr. Stewart, Graham.*)

Linaria cirrhosa, *H. K. Tendrilled Toad Flax.*

Linn. Syst. *Didynamia Angiospermia.*

A deciduous trailing annual, with much-branched spreading stems and hastate, alternate, petioled leaves; petioles longer than the leaves, often with tendrils; peduncles erect, stiff; calyx pentapartite, lower segments remote; corolla spurred, gaping, yellow; capsules ovate, 2-valved.

Found in Sind, Egypt, Arabia, and the Deccan, perhaps also in Northern India. This, like *L. ramosissima* (see *Antirrhinum glaucum*) is used as a remedy in diabetes.

ALLIANCE 50. *CAMPANALES.*

N. O. 268. GOODENIACEÆ.,—*GOODENIADS.* Lind.—Bal. N. O. 122.

Scævola Taccada, *Roxb. Fl. Ind. i.* 527; *Lobelia Taccada, Gart fruct. i.* 119 *t.* 25.

Linn. Syst. *Pentandria Monogynia.*

A herbaceous shrub, 4–6 feet high, with erect branches; leaves alternate, subsessile, obovate, glabrous, 2–5 inches long; flowers white, fragrant, in axillary, solitary, 2–3 dichotomous peduncles; pedicels clavate; bracts opposite; calyx 5-leaved; corolla 1-petalled; tube longer than the calyx, villous, longitudinally cleft.

Sind (Kurrachee), Coromandel Coast, Delta of the Indus and Ganges.

Eaten as a potherb by natives. The Malays attach some superstitious qualities to its berries, and from the pith of the stem and thick branches they make artificial flowers, &c.—(*Lindley.*)

N. O. 270. VALERIANACEÆ,—*VALERIANWORTS.* Lind.—Bal. N. O. 117.

Nardostachys Jatamansi, *W.*; *Valeriana Jatamansi, Jones. Roxb. Fl. Ind. i.* 163. *Spikenard.*

Linn. Syst. *Triandria Monogynia.*

The root—Spikenard.

Vernacular—Jatamansi, Balchari, *Hind.*; Bekh-i-Sumbul. *Pers.*; Sumbul-hindee, Muygiah, Amultibee, *Arab.*

A dwarf herbaceous plant, native of Nepaul, the Punjab Himalaya, to 10,000 feet, also Bengal and Western India. The hairy tap-like root of this plant, according to Professor Royle and Sir William Jones, is the *Spikenard* of the ancients It is mentioned in the "Song of Songs" of Solomon, on the occasion of his unscriptural marriage with the daughter of Pharaoh, and in the New Testament by Saints Mark and John. That it was precious and the most valued of perfumes, there can be no doubt. Horace promises Virgil a whole cadus (about 36 quarts) of wine for a small onyx box of Spikenard (*Rosemuller*, p. 168). The composition of this ointment, according to Dioscorides, is described as being a basis of nut oil, and having as ingredients *Malabathrum, Schœnus, Costus, Amomum, Nardus, Myrrha* and *Balsamum*; almost all the most valued perfumes of antiquity. The same author unequivocally specifies the Spikenard as *Nardos indike*, called also, as he states, "*Gangetic*, from a river called Ganges," and mentions other kinds, or varieties, as Syrian, Celtic, and Mountain Nard, from their respective places of production.

Spikenard or Balchore, the name by which this root is best known in India, resembles the bushy tail of the ermine, being covered almost entirely with coarse setaceous fibres. It occurs in the form of short pieces, about the thickness of a goose-quill, covered with a thin, dirty-brown colored bark, having a strong and fragrant odour. It contains about 9 per cent. of a balsamic resin and a small proportion of essential oil. It is held in high esteem throughout India, not only as a perfume, but as a remedy in epilepsy, hysteria and convulsive affections; and in this class of cases there is good reason for regarding it as a remedy of considerable power. The result of trials with it by Sir William O'Shaughnessy and other medical officers tends to show that it is a perfect representative of the officinal valerian, a medicine of much value in such cases. In South India a fragrant cooling liniment is made with this root in conjunction with a bland and a few fragrant oils. In Chumba, where the plant grows, it is said to be added to the beer of that tract. It is also exported to the plains to be used as medicine, being considered cordial.—(*Lindley, Ainslie, Cleghorn Punj. Rep., Asiat. Researches*, vol. II. p. 416, vol. IV. p. 97, *Dr. Stewart, Kitto's Bib. Cyc. Pharm., Pharm. of Ind.*)

N. O. 273. ASTERACEÆ,—*COMPOSITES*. Lind.—Bal. N. O. 120.

Vernonia anthelmintica, *Willd. iii.* 1634; *Conyza anthelmintica, Roxb. Fl. Ind. iii.* 406. *Purple Flea-bane.*

Linn. Syst. *Syngenesia Æqualis.*

The seed.

Vernacular—Kanana-jeraka, *Sans.*; Buckshee, *Hind.*; Somraj, *Beng.*; Kalu-jeera, *Dec.*

This annual is common in waste places throughout India, and is cultivated in Sind. The small dark-colored and extremely bitter seeds, which are about an eighth of an inch in length, and covered with whitish hairs, are held in high esteem by natives as an anthelmintic, in which character it acts powerfully, expelling lumbrici in a lifeless state. The mode of administration is an electuary with honey. Diuretic properties are also assigned to them. Dr. Gibson, as the result of personal experience, regards them as a valuable tonic and stomachic in doses of 20 to 25 grains. They are also said to be an ingredient in a compound for snakebites. An infusion is given on the Malabar Coast for coughs and in cases of flatulency. Reduced to powder and mixed with lime-juice, they are used to banish pediculi from the hair and body. In the Punjab they are employed in anasarca and in plasters for abscesses. The seeds of *Vernonia cinerea*, Lees, are used in decoction by natives to promote perspiration in fevers.—(*Ainslie, Roxb., Dr. Stewart, Pharm. of Ind.*)

Eclipta prostrata, *Roxb.*; *Willd. iii.* 2218. *Trailing Eclipta.*

Linn. Syst. *Syngenesia superflua.*

The root.

Vernacular—Bhangra, Maaka, *Dec., Punj.*; Keysuria, *Beng.*; Tik, *Sind.*

An erect or prostrate annual; stem strigose; leaves opposite, subsessile, lanceolate, and remotely serrate; peduncles axillary, 2-3 flowered; flowers nearly sessile; anthers brownish grey; calyx simple, alternate; receptacle paleaceous; pappus wanting florets of disk, 4-fid.

Indigenous in Sind, the plains of the Punjab, and occasionally to 5,000 feet on the hills; also in Ceylon, Japan, Cochin-China, Bengal, and Southern and Western India.

A poultice made of the bruised leaves mixed with gingelly oil is an useful external application in the disease or morbid enlargement of the leg named elephantiasis. In Sind the expressed juice of the roots is employed as an emetic. Its use in affections of the liver and spleen and in dropsy is noticed in the reports of Dr. G. Smith and

Mr. J. Wood and other surgeons. Mr. Wood indeed states that from what he has learnt of its properties, he considers that it will be found eventually of greater service than *Taraxacum* in hepatic derangements. In tatooing, the natives of Bengal, after puncturing the skin, rub the juicy green leaves over the part, which gives the desired indelible color, viz. a deep bluish-black. In Cochin-China and Brazil the natives use the juice of the leaves to dye their hair black.—(*Dr. Stewart, Ainslie, Pharm. of Ind., Roxb., Graham.*)

Sphæranthus indicus, *Willd. iii.* 2394. *Indian Sphæranthus.*

Linn. Syst. *Syngenesia Segregata.*

The flowers.

Vernacular—Moondee, *Sans.*; Moondhree, *Dec.*; Chagul-nadee, *Beng*; Khamadrus, Ghundee, *Punjab.*

Extremely common in the Deccan and Concan; also in Ceylon, and the Eastern and Central Punjab.

The flowers are highly esteemed in the Punjab as an alterative; they are also considered depurative, cooling, and tonic. The small oblong seeds and root are reckoned anthelmintic, and are prescribed in powder: the latter, according to Rheede, being powdered and employed on the Malabar Coast as a stomachic. The bark ground small and mixed with whey is said to be a valuable remedy for piles.—(*Ainslie, Dr. Stewart, Graham.*)

Grangea maderaspatana, *Willd.*; *Artemesia Maderaspatana, Willd.*; *Roxb. Fl. Ind. iii.* 422. *Madras Grangea.*

Linn. Syst. *Syngenesia Superflua.*

Vernacular—Afsunteen, *Arab.*; Mustarroo, *Hind.*

A procumbent annual, with alternate, pubescent branches, and sessile, oblong, sinuate, pinnatifid downy leaves; peduncles 1-flowered, opposite the leaves; female florets 3-toothed.

Occurs in Sind and Afghanistan, the Deccan, Bengal, and the Malabar Coast.

Its leaves are considered by native practitioners on the Malabar Coast and in the Deccan to be a valuable stomachic, and to possess deobstruent and antispasmodic properties. The leaves of *Grangea Ægyptiaca* are used in Sind as an emollient application to ulcers.—(*Ainslie.*)

Xanthium indicum, *Roxb. Fl. Ind. iii.* 601. *Indian Xanthium.*

Linn. Syst. *Monœcia Pentandria.*

Vernacular—Bun-okra, *Hind., Beng.*; Arishta, *Sans.* The fruit, *Gokroo.*

An erect, robust annual, 2–3 feet high, with tough, unarmed stems, generally marked with dark spots; leaves alternate, petioled, broad cordate, waved, scabrous and grossly serrate, somewhat 3-lobed; petioles as long as the leaves; flowers terminal, white.

Sind, Punjaub, and Deccan. An infusion of the leaves of this plant is said to dye yellow. The prickly fruit is considered cooling and demulcent. In the Punjab, and in Sind also, *Xanthium strumarium*, called *Gokroo Kallan*, is given in smallpox, on the doctrine of signatures. Its hairs and prickles are employed as medicine in China, where the plant grows, and from the seeds an oil is extracted which is burned in lamps.—(*Dr. Stewart, Smith.*)

Pyrethrum indicum, *H. K.* *Indian Feverfew.*

Linn. Syst. *Syngenesia Superflua.*

The root.

Vernacular—Akurkurra, Gool-daoode, *Hind.*; Zoenil, *Punj.*

This plant is believed to have been the *Anthemis pyrethrum*, or "Pellitory of Spain" of the moderns, and was familiar to Arabian writers on medicine. It is a native of Barbary, Arabia, Syria, Calabria, and Bohemia. Under the first synonyme Honigberger mentions a species that is found in Cashmere, the root of which, when given for salivation in proper quantities, *cures*, and, in excess, *produces* it. "Akurkurra" is a drug commonly used for tooth-ache, and assigned by Jameson to *Spilanthes oleracæa*. It is probably derived from different plants in different places. It is prescribed largely in infusion, in conjunction with the *lesser galangal* and ginger by native practitioners; and by itself in European practice, for colic, hysterical affections, pain in the head and lethargic complaints; also in typhus fever. In paralysis of the tongue it has been used as a local application with advantage; also in apoplexy, chronic ophthalmia, and rheumatic affections of the face. By the Persians it is considered discutient and attenuant, and according to Celsus, it was an ingredient in the famous cataplasm which, in his time, was employed as a resolvent and for maturing pus; also as an agent for opening the mouths of wounds.

Pellitory has been analysed by several chemists, whose labours have shown that its pungent taste is due in part to a resin not yet fully examined. It also contains a little volatile oil, besides gum, sugar, and a trace of tannic acid.—(*Loudon, Duncan's Edin. Disp., Dr. Stewart, Pharm., Ainslie, Pharm. of Ind.*)

Anthemis nobilis, *W.* *Common Chamomile.*

Linn. Syst. *Syngenesia Superflua.*

The flowers.

Vernacular—Baboonee-phool, *Hind., Dec.*; El-dakl-mirzie, *Arab.*; Baboona-ga, *Pers.*

This perennial is the *Anthemis* (ανθεμις) of Dioscorides and the *Anthemon* (ανθεμον) of Theophrastus. Indigenous in England and Persia, and plentiful in France, Spain, Germany, and Russia. The flowers are brought to India from Persia, and are sold in the bazaars under the name of *Baboonee-phool*. These pleasant smelling, bitter, aromatic flowers are extensively used, both in European and native practice, as a valuable medicine. They are tonic, carminative, and to a certain degree anodyne; but a strong infusion of them operates as an emetic. Their active constituents are a bitter extractive and an essential oil. To the latter is ascribed their antispasmodic, cordial and diaphoretic effects; and to the former their influence in promoting digestion. They are used with advantage in suppression of the menstrual discharge, in the vomiting of puerperal women, and in after-pains; also in gout and intermittents, and in constitutional debility, dyspepsia, and all cases where the tone of the digestive organs or the system generally is depressed. Externally, chamomile flowers are applied as a discutient and emollient, and in the form of glyster, in colic, dysentery, and hernia. They may be used either in powder, infusion as tea, or in decoction or extract. The essential oil obtained by distillation possesses antispasmodic powers in a higher degree. In the Punjab, *Matricaria Chamomila* is found wild in the plains, and the flowers, under the name of Baboona, prescribed as tonic and febrifuge, exert the same influence, and have the same powers as those of the officinal species. The oil from them is used as a liniment in rheumatism.—(*Ainslie, Lindley, Royle, Duncan's Edin. Disp., Pharm of Ind., Dr. Stewart.*)

Berthelotia lanceolata, *DC.*; *Royle. ill.* 1 *p.* 319.

Linn. Syst. *Syngenesia Superflua.*

The leaves.

Vernacular—Reshamee-sunnai, Ra-sunna, *Punj.*; Koura-sunna, *Sind.*

An annual, with spreading branches, and opposite, petioled, oval

or oblong leaves covered with stomata on both sides; edges vertical; florets tubular, with silky pappus.

A native of Sind, and the arid tract of country extending from the banks of the Jumna towards Central India, common in many parts of the Punjab plains up to Peshawur, in places forming thickets up to 4 and 5 feet high. The leaves possess aperient properties, and are pronounced by the late Dr. Falconer to be an excellent substitute for senna. They much resemble the leaves of *Salvadora indica*, and were given to Dr. Royle as such. They are little used in Sind as a purgative, but may be found largely mixed, as an adulteration, with senna leaves. The roots of this plant are considered purgative.—(*Pharm of Ind., Dr. Stewart, Royle.*)

Cotula anthemoides, *W.* *Anthemis-like Cotula.*

Linn Syst. *Syngenesia Superflua.*

The leaves.

Vernacular—Baboona, *Hind.*

This plant would appear to grow wild in the eastern part of the Punjab plains. It probably furnishes part of the officinal Baboona (*Matricaria chamomila*), which is heated with oil and applied in rheumatism.—(*Dr. Stewart.*)

Artemesia indica, *W.* *Indian Wormwood.*

Linn. Syst. *Syngenesia Superflua.*

The leaves and top.

Vernacular—Afsunteen, *Arab.*; Gundmar, *Hind.*; Chamree, Tarka, Booi-madaran, *Punj.*

This plant is said to have been named Artemis—one of the names of Diana, the goddess of chastity, on account of the purposes to which it was applied in bringing on precocious puberty. Among tonic, bitter, and aromatic medicines the plants of this genus are more deserving of notice, the various species having been employed in medicine from the most remote antiquity. Of these, wormwoods are the most celebrated; they derive their English name from their employment as vermifuges. The plant under notice is a powerful deobstruent, and its strong aromatic odour and bitter taste indicate stomachic and tonic properties, and according to Ainslie it is regarded as possessing such by the people of Southern India, who sometimes also use it in antiseptic fomentations, as they do its congener, *Artemesia abrotanum.* In nervous and spasmodic affections, connected with debility, the leaves and tops are administered, and an infusion of them in phagadenic ulceration. Bellew states that in Afghanistan, as throughout India, a strong decoction is given as a vermifuge, and a weak one to children in measles He also mentions that an infusion of any of the Artemesias is given as a tonic. In Sind and Persia *Artemesia vahliana* also furnishes a tonic, febrifuge, and vermifuge.—(*Lindley, Loudon, Ainslie, Pharm. of Ind.*)

Artemesia sternutatoria, *W.* *Sneezewort.*

Linn. Syst. *Syngenesia Superflua.*

The powdered leaves.

Vernacular—Nakchiknee, *Hind.*; Afkar, *Arab., Sind*; Nagdowna, *Hind., Beng.*

Occurs in Sind, Beloochistan, and the plains of the Punjab. The powdered leaves are used in affections of the head, such as colds, &c. as a sternutory. Boiled to a paste and applied to the cheeks it is employed in the cure of tooth-ache.—(*Dr. Stewart.*)

Aucklandia Costus, *Falc.*

Linn. Syst. *Syngenesia Superflua.*

The root—Costus.

Vernacular—Putchuk, *Hind.*; Koot, *Guz.*; Koost, *Arab., Pers.*

This plant is a native of the moist open slopes surrounding the Valley of Cashmere, at an elevation of 8,000 to 9,000 feet; it occurs also from 10,000 to 13,000 feet in parts of the basins of the Jhellum and Chenab. It was first shown by Dr. Falconer, who satisfactorily identified it to be the source of the *Costus Arabicus* of the ancients, of which, according to Dioscorides, there were three kinds, viz. Arabian (κόστος ἀραβικὸς) white, best of all; Indian (κόστος ἰνδικὸς) dark, and Syrian (κόστος συριακὸς), pale yellow. The first was probably for ages exported from the tracts near Cashmere, and has been by Dr. Royle identified with the Putchuk root met with in the bazaars. Dr. Irvine (*Med. Top. of Ajmere*, page 107) states that, formerly when opium was not produced in Rajwarra, this root was extensively smoked as a stimulant. It has a strong aromatic odour, and is used as an incense in temples, and to protect the exquisite shawls of Cashmere and other cloths from the attacks of insects, being packed with them in the bales. It is also used with other compounds as a perfume for the hair. By native practitioners it is prescribed as a stomachic and tonic, and in the advanced stages of typhus fever. In the Punjab it is applied in powder to ulcers, for worms in wounds, and also in rheumatism. It is considered depurative and aphrodisiac. Roxburgh says the natives consider a preserve made of it wholesome and nutritious.—(*Roxb., Ainslie, Lindley, Dr. Stewart, Cleghorn Punj. Rep., Birdwood.*)

Carthamus tinctorius, *W.* *Officinal Carthamus.*

Linn. Syst. *Syngenesia Æqualis.*

The flowers and seeds.

Vernacular—Koosumb, *Hind., Dec.*; Kajireh, *Beng.*; Kammalatora, *Sans.*; Usfar, *Arab.*; Quortum, *Pers., Sind.*

An annual, rising with a stiff ligneous stalk; cultivated in Sind and to some extent in most parts of the Punjab plains, and rarely on the hills, occasionally to 5,500 feet, and more sparingly towards the North-West. Moorcroft and Masson mention it at Kabul, and the former says that what is raised there gives more color than that of India, to where the flowers are exported; but this seems unlikely. It is also grown in Cochin-China and China. In the first mentioned place it is called *Cay-Rum.* It is said to be indigenous to the Indian Islands, but is, by Mr. Crawford's account, most successfully cultivated as a dye in Bali, and grows in great perfection in Macassar and Celebes. (*Hist Ind. Arch.*) It is the κνῆκος of Hippocrates, Theophrastus, and Dioscorides, and the *Crocus Indicus* of Rumphius.

A fixed oil, called *Kurdee-ka tael*, is prepared from the seeds of this plant, and used as an external application in rheumatism, paralytic affections, and bad ulcers; the seeds themselves are reckoned as a laxative, for which purpose an emulsion is made with honeyed water. In the Punjab Dr. Stewart says "the seeds are eaten or have the oil extracted; and that they are officinal, being considered diuretic and tonic." Loureiro tells us that they are considered as purgative or *eccoprotic*, resolvent and emmenagogue. They are also used in dropsical cases. The flowers (safflower) are used by the Chinese to produce a beautiful pink, purple, violet and rose color for dying their silks, and are imported to England for dyeing and painting. In India they are also used for dyeing. According to Barham a drachm of the dried flowers cures the jaundice. In South America, as well as in Jamaica, they are much used in coloring broths and ragouts. The fine rose color of safflower extracted by crystalized soda, precipitated by citric acid, and ground with fine talc, after undergoing a slow drying, produces the beautiful *rouge vegetale.* In Dr. Ure's *Dictionary of Arts and Manufactures*, &c., good accounts are given of the different processes of dyeing with these flowers. The seeds of *C. persicus*, according to Colonel Sykes, produces an useful oil, which is edible when fresh. The oil cake after expression of the oil is given to milch cattle as a nourishing food.—(*Dr. Stewart, Lindley Veg. King., Loudon, Crawford's Indian Archipelago, Ainslie, Mat. Ind., Dr. Ure Dict. of Arts and Manuf.*)

Carduus nutans, *H. K.* *Musk Thistle.*

Linn. Syst. *Syngenesia Æqualis.*

The flowers.

Vernacular—Kancharee, Badaward, *Punj.*

Found in the plains of the Punjab up to the Trans-Indus. The flowers are employed as a febrifuge both in Sind and the Punjab, and with those of *C. Arabicus* used to curdle milk. Camels eat the plant greedily.—(*Loudon, Dr. Stewart.*)

Cichorium intybus, *W.* *Wild Succory.*

Linn. Syst. *Syngenesia Æqualis.*

The root and seeds.

Vernacular—Hinduba, Kasnee, *Hind., Pers.*

The σέρις of Dioscorides and κιχώριον of Theophrastus.

Two varieties of this plant are grown in many parts of Europe and India; both have the same synonymes and are indiscriminately used medicinally, being carminative and cordial, and considered to possess properties analogous to those of *Taraxacum.* The pilose variety is not uncommon wild in the plains of the N. W. Punjab and in Cashmere, &c., to 5,500 feet. The tap-like roots are used as a substitute for, and as an addition to, coffee, which they certainly improve when torrefied and added in small quantities, and it is to this admixture that some persons attribute the superior flavor of the French to the English coffee. The Egyptians who are said to use it largely consider their chicory of much consequence, and it is well known that both the leaves and root once constituted half the food of the poorer classes, and probably do so at the present day. The French use the leaves under the name of *Barbe du capucine* as a kind of *salad,* the leaves being blanched for the purpose. They are said to dye blue when prepared in the same manner as woad.—(*Chem. Gaz., Lindley, Loudon, Dr. Stewart, Royle, Birdwood.*)

Leontodon taraxacum, *Linn.* *Common Dandelion.*

Linn. Syst. *Syngenesia Æqualis.*

The root.

Vernacular—Pathree, *Dec.*; Doodhlee, Kanphul, Shamooke, *Punj.*; Buthur, *Sind.*

A herbaceous perennial, with numerous, radical, runcinate, glabrous leaves; divisions toothed, broad; scapes one or more, about 6 inches in height, with a single head of flowers; outer scales of the involucre reflexed.

Found abundantly throughout Europe, Asia, and North America. Common from the level of the plains in the Punjab (N. W.), in the Sutlej Valley between Rampoor and Sungnum, to 13,000 feet in the Punjab Himalaya, and occasionally to 17,500 feet in Ladak. Common also in Sind and Beloochistan.

Though the common Dandelion is a plant which must have been well known to the ancients, no distinct reference to it can be traced in the classic authors of Greece and Italy. The word *Taraxacum* is however usually regarded as of Greek origin; the generic term *Leontodon* being from *Leo* a lion, and *odonto* tooth, in allusion to the deep tooth-like divisions of the leaves.

Taraxacum is first met with as *Tarakshagun* in the works of the Arabian physicians, who speak of it as a sort of wild *Endive.* It is thus mentioned by Rhaze and Avicenna in the 10th and 11th century. Dandelion was much valued as a medicine in the time of Gerard and Parkinson; and is still extensively employed It appears to be of considerable medicinal importance as an anodyne, deobstruent and diuretic; in cases of chronic diarrhœa it has been found very useful according to Mr. Houlton.

In dyspepsia, torpor and congestion of the liver, also in jaundice, it has been employed with advantage. In many places in the Punjab the young plant is eaten as a vegetable, and Honigberger mentions that it is officinal in Cashmere. It has been recommended as a salad, but notwithstanding that it possesses too much bitter principle to fit it for table use under any management, it is eaten in some parts of Europe. The fusiform roots, which abound in a milky juice, are eaten *raw* as a salad by the French, and *boiled*, by the Germans like *salsafæ* and *scorzonera*. Dried and ground into powder, they afford a substitute for coffee, in all respects equal to chicory. In Sind they are eaten by shepherds and others, and are prized as an alterative tonic. The expressed juice of the roots, which is the principle form for administration in medicine, according to Geiger, contains gum, albumen, gluten, an odorous principle, extractive, and a peculiar crystalizable bitter principle, *taraxine*, soluble in both alcohol and water.—(*Pharm., Pharm. of Ind., Dr. Stewart, Loudon, Lindley, Cleghorn Punj. Rept., Royle, Pereira, Paris Pharmacologia.*)

Lactuca sativa, *W.* *Garden Lettuce.*

Linn. Syst. *Syngenesia Æqualis.*

The seeds.

Vernacular—Khus, Kahoo. *Hind.*; Kahoo, *Sind.*; Choff, *Egypt.*; Salada, *Cing.* The seeds—Khus or Kahoo-ka beej.

An annual, with an erect smooth stem 1½ to 2½ feet high, and rounded or oval leaves; cultivated throughout Europe and India, and all over the civilized world.

This succulent vegetable, which is a most valuable salad, abounds in a cooling, bland, pellucid and pleasant tasted juice, before its flower-stem shoots; after that in a *milky* juice of an intensely bitter taste, and strong odour like that of opium, which flows from incisions made into the cortical portion of the stem, and forming what is called "Lettuce opium" or "Lactucarium," to which Dr. Cox of Philadelphia and Dr. Duncan of Edinburgh first called attention. Dr. Francois subjected it to further examination, and called it *Thridace.*

This juice, analysed by Mr. Hohn of Berlin, was found to consist of water, caoutchouc as its principal solid constituent, a trace of resin, a small quantity of bitter extractive, and phosphates, muriates, and sulphates. According to this analysis, the milky juice of lettuce would seem a very inert substance, as the caoutchouc, which is its principal solid constituent, has no action on the body; but it is evident Mr. Hohn overlooked the most active ingredient, which is an alkaloid, analogous to morphia. No trace of morphia or narcotine was found even in the analysis of M. Caventon and M. Dublanc, junr.

The lettuces are all narcotic. *Lactuca virosa, Lactuca scariola* and *Lactuca altissima* also yield *Lactucarium*, but according to Ambergier of Clermont-Ferrand, the best *Lactucarium* is obtained from the last species (Comptes, R. XV, 923), a native of the Caucasus, now cultivated in parts of France. At the present day the *Lactuca virosa* (the strong-scented lettuce, the supposed parent of the garden kind), is directed to be used in the preparation of *Lactucarium*, the yield being much larger and of superior quality. The juice of this plant, as analysed by Walz, was found to contain a volatile oil, a yellowish-red tasteless, and a greenish-yellow acrid resin; crystalizable and uncrystalizable sugar, gum, pectic acid, albumen, a brown basic substance, a principle like humus, extractive, a concrete oil or wax (one part of which insoluble in ether is the same as the caoutchouc of other analysts), oxalates and other salts, with a neutral active principle which has been named *Lactucin*. This is in acicular crystals, colorless and inodorous, very bitter, fusible and soluble in water, ether, alcohol and dilute acids. The watery solution is very bitter, neutral and not precipitable by any re-agent.—(*Walz. Ann. Der Pharm*, xxxii.)

Lactucarium has been highly extolled as an anodyne, although it appears to be an inert substance. Dr. Garrod states that he has given as much as 30 grains every four hours without noticing any decided narcotic effect from its administration. It is also diaphoretic and slightly diuretic in dose of 2 to 5 grains (5 to 30 Garrod), and is used

to allay coughs, in phthisis, bronchitis, and asthma. It has also been prescribed in rheumatism, insanity, spermatorrhœa, dropsy, &c. and in checking frequent stools in diarrhœa.

It is not known whether *Lactucarium* is prepared in India, but the plant is widely cultivated as a salad, and for its seeds, which are considered diuretic and purgative, and which according to M. Cheran do not contain morphia or narcotine, but yield a distilled water similar to that drawn from the plant by cohobation.

There remains, after distillation, a turbid, thick residuum, covered with a thin coat of oil.

The cultivated species is eaten wherever grown. Masson mentions it as abundant at Cabul, and Davies' *Trade Report* gives 10 maunds of the seed as being imported thence via Peshawur.—(*Duncan's Edin. Disp., Supp. to Ditto, Pharm., Pharm. of Ind., Lindley, Loudon, Dr. Stewart, Royle, Garrod, Ainslie, Graham.*)

Lactuca sarmentosa, *W.*

Linn. Syst. *Syngenesia Æqualis.*

The inspissated juice of the stem.

Vernacular—Bun-kahoo, *Sind.* The inspissated juice—Khee Khowa.

An annual with a tubular stem rising to about 3 feet; leaves laciniate or jagged, ensiform, smooth beneath; lower ones toothed, oblong and narrowed at the base; upper entire, lanceolate, fringed with short hair.

Common in Sind (plentiful in Kurrachee). The milky juice of the stem of this plant is collected by natives and used with the oil of the seeds of *Pongamia glabra* or the juice of the leaves of *Vitex leucoxylon*, as an external application in rheumatic affections. As a soporific for children it is also employed in doses of half a massa.

ALLIANCE 51. *MYRTALES.*

N. O. 274. COMBRETACEÆ,—*MYROBALANS.* Lind.—Bal. N. O.

Terminalia bellerica, *Roxb.* *Belleric Myrobalan.*

Linn. Syst. *Polygamia Monœcia.*

The fruit.

Vernacular—Bayrda, Boohayra, *Hind.*; Boohayrika, *Sans.*; Bayra, *Beng.*; Bairda Balda, *Dec.*; Belayleh, *Pers.*; Bayrah, *Punj.*, *Sind.*

A large tree with dense foliage, which makes it useful for planting in gardens or on roadsides. It is a native of the mountainous parts of the Circars, and is common also in the Western Presidency and Burma. It occurs in the eastern part of the Siwalick tract and along the foot of the Himalaya and the outer valleys, extending nearly to the Indus. Not found in Sind.

The kernels of the fruit are eaten by the natives; they taste like filberts, but are reckoned intoxicating when eaten in any quantity. Half ripe, the fruit is purgative, and ripe or dried, astringent, and is used medicinally in mucous discharges from the lungs and bowels. Mixed with honey it is said to be an useful application in ophthalmia. It is also held in esteem by natives in the cure of piles. As a mordant in dyeing and tanning it is much used, and also for making ink. The exudation from the bark, a substance much resembling gum arabic, is also considered purgative.—(*Roxb., Ainslie, Dr. Stewart, Brandis, Lindley, Graham.*)

Terminalia chebula, *Roxb.* *Oval-leaved Terminalia.*

Linn. Syst. *Polygamia Monœcia.*

The fruit—Chebulic myrobalan.

Vernacular—Hurda, *Hind.*; Hurda, *Dec.*; Hurritaka, *Sans.*; Harrar, *Punj.*; Hur, *Sind.*

A large tree, a native of the forests of India, from Cape Comorin to the mountains which bound the plains of Bengal, Oude, &c. on the north. It is also found in the Siwalick tract, up to the Peshawur Valley, ascending to 5,000 feet, also in Southern and Western India and in Cabul.

First described by Avicenna and again by Bryenius, in the 17th century. The ripe fruit of both this and the last species constitute the *myrobalan* of commerce. The fruit of the species under notice is infinitely more astringent than that of the preceding, and is on that account much more used by the natives of India in their arts and manufactures (*Asiat. Res.*, Vol. II. p. 41), and it would appear from experiments made by Dr. Roxburgh (*Orient. Repty.*) that it is even more astringent than the Alleppo galls. What is called *Zengi-hur* or *Hurda* in the Bengal provinces is the *Indian* or *black myrobalan* of old writers, and is in fact the dried fruit of this tree.

As found in commerce *black myrobalans* are shrivelled, ovoid bodies from ½ to ¾ of an inch in length, having a shining fracture and an extremely astringent taste. Well rubbed with an equal proportion of catechu, this nut is considered by native practitioners to be an excellent application in aphthous affections of children and adults. It is also recommended administered in honey as a good purgative. Its virtues are highly extolled by Rajah Kalkissen (*Cal. Med. Phys. Trans.* vol. V., p, 42), who regards it as combining mild purgative with carminative and tonic properties. Twining (*Diseases of Bengal*) speaks favorably of the drug in the same character, and gives a case of enlargement of the spleen where it produced good effects. As a substitute for galls in lotions, injections, &c. myrobalans are of service. Dr. Waring as the result of his own personal experience speaks in the highest terms of their efficacy in dysentery and diarrhœa of natives, especially in infantile diarrhœa.

The tender leaves while scarce unfolded are said to be punctured by an insect, the larvæ of which was found to be three-eighths of an inch long and a quarter broad, and which, Dr. Roxburgh thinks, could they be procured in any quantity, might prove as valuable a dye as the cochineal insect. The galls thus formed are powerfully astringent, and make as good ink as oakgalls, and answer well for tanning. They also yield to the chintz-printers in the Coromandel Coast their best and most durable yellow; and when combined with alum and ferruginous mud give an excellent black.

The fruits of this tree are arranged into six classes in the 11th volume of the *Asiatic Researches*, viz. :—

Helileh-zireh—the fruit dried when just formed, and the size of cummin seed.

Helileh-jawi—the fruit dried when the size of a barley corn (jow).

Helileh-zengi—the fruit dried when the size of a raisin and black like a negro (zengi).

Helileh-chini—larger than last, and greenish.

Helileh-asfar—the fruit near maturity and yellow.

Helileh-cabuli—the fruit at full maturity under the name of *Surwarree-hurda.*

Mature myrobalans sell in Bombay for a rupee each.—(*Lindley, Ainslie, Roxb., Brandis, Dr. Stewart, Graham, Pharm. of Ind., Birdwood.*)

N. O. 277. HALORAGEACEÆ.—*HIPPURIDS.* Lind.—Bal. N. O. 90.

Trapa bispinosa, *Linn.* *Water Caltrops.*

Linn. Syst. *Tetrandria Monogynia.*

The fruit.

Vernacular—Paneophul, *Beng.*; Singhara, *Hind.*; Shingaree, *Dec.*; Gaworee, *Punj.*

Cultivated in tanks or pools in many parts of India. In parts of the Punjab plains up to Peshawur it is not uncommon; and in Cashmere (5,000 feet) miles of the lakes and marshes are covered with this plant. The fruit, which in flavor resembles a chestnut, is eaten both raw and cooked, and in some places forms the staple food of the inhabitants. *Trapa natans*, called *marron d'eau* by the French, is said to have furnished food to the ancient Thracians, and *Trapa bicornis* to the Chinese. It is mentioned by Dr. Royle that this fruit (*T. bispinosa*) yielded as much as £12,000 a year of revenue to the Government of Runjeet Sing; the tax being levied upon from 96,000 to 128,000 ass loads from the great lake of Oolur. The flour of the dry fruit forms an ingredient in the red powder (*goolall*) used in the Holee festival.—(*Lindley, Dr. Stewart.*)

N. O. 279. RHIZOPHORACEÆ,—*MANGROVES.* Lind.—Bal. N. O. 79.

Ceriops Candoleana, *Arnott*; *Wight. Ic. t.* 240.

Linn. Syst. *Dodecandria Monogynia.*

The bark.

Vernacular—Chowree, Kirree, *Sind.*

A small tree with broad, obovate leaves, wedge-shaped base, and rounded apex; peduncles short; flowers subsessile, capitate or capitellate.

Common in Sind at the mouth of the Indus, and in the salt-water creeks, Kurrachee, and on the coast.

The mangroves are readily known from every order to which they can be usefully compared by their very curious habit of germinating while the seeds are still attached to the branch that bears the fruit. The radical and club-shaped crown of the root gradually lengthens until it enters the soft muddy soil, or if too high, drops, and fixing itself in the muddy bottom, immediately strikes root at one end, while leaves unfold at the other (*Wight*). In *Carallia*, however, the seeds do not germinate in the pericarp. Almost every part of these plants (the bark, roots, and fruit more particularly) abounds in an astringent principle, which is successfully employed in tanning; *Ceriops candoleana*, the plant under notice, *Rhizophora mucronata*, Lam. and other species of the genus being the chief kinds used. For arresting hæmorrhage and disposing malignant ulcers to assume a healthy action, a decoction of the bark has been found useful as an external application, and on the African Coast a decoction of the shoots is said to be efficient as a substitute for quinine. For tanning, the bark of these plants is said to be superior to the oak, completing in six weeks an operation which, with the latter, would occupy at least six months. Sole leather so tanned is said to be more durable than any other. (*Hamilton in Pharm. Journal.*) All the mangroves yield good hard and durable timber.—(*Lindley, Lieut. Carless's Rep. on the Indus, Graham.*)

Rhizophora mucronata, *Lam.*; *Wight. Ic. t.* 238; *R. Candelearia, W. and A. Prod.* 310.

Vernacular—Kamo, Bhora, *Sind.*

A small glabrous tree; leaves opposite, coriaceous, elliptic, broadly cuneate at base, terminating in a narrow apiculus; midrib prominent; peduncles axillary in lax dichotomous cymes; flowers white, 8-androus, sweet-scented, coriaceous; fruit ovoid, furrowed; radicle of the seed germinating on the tree.

Common along the estuary of the Indus and coasts and backwaters of India generally. The fruit is said to be edible, and its juice made into a light wine by fermentation. Bark a good astringent and used for tanning leather.

Bruguiera gymnorhiza, *Lam.*; *W. and A. Prod.* 311.

A large evergreen tree; leaves oblong and elliptical, 3–6 inches long, 1¼–2¼ in. broad, narrowed into a petiole; stipules oblong, deciduous; flowers solitary or a few together on short axillary peduncles; bracts none; germination as in rhizophora.

Common along the estuary of the Indus and the sea coasts of India. Bark used in Sind for dying black.

N. O. 282. MYRTACEÆ,—*MYRTLEBLOOMS.* Lind.—Bal. N. O. 85.

Punica granatum, *Linn.* *Pomegranate.*

Linn. Syst. *Icosandria Monogynia.*

The root, bark, rind of the fruit, and seeds.

Vernacular—Anar, Dhaleem, Dharimb, *Hind.*, *Dec.*, *Pers.*, *Punj.*, *Sind.* The rind, Khasiala-chodee, *Sind.*

A shrub or small tree rising to the height of 18 feet, native of the South of Europe, Arabia, Persia, Japan, and Barbary. Cultivated in the Indian Archipelago and in Western and Southern India. It is common wild in the N. W. Punjab, Himalayas at from 2,500 to 6,000 feet, Cabul, and the hills west of Sind to 4,000 feet.

The pomegranate has been highly prized by mankind from the remotest antiquity, as is shown by the references to it in the Mosaic writings and by the numerous representations of the fruit in the sculptures of Persepolis and Assyria (Layard's *Nineveh and its Remains*), and on the ancient monuments of Egypt (Wilkinson's *Ancient Egyptians* II., 142.) The parts of this plant which were employed by the ancients in medicine are still so used in India and the East generally. The flowers—the *balustine* or *balaustium* of the ancients—are powerfully astringent and have long been used both internally and externally in gargles and for diarrhœa, sloughing ulcers, &c. They are devoid of odour, but have a bitterish astringent taste, and tinge the saliva a reddish color. They contain tannin, and strike a black with ferruginous salts. The bark of the root is also employed as an astringent, and is considered a perfect specific in cases of tape-worm. A decoction of it as first recommended by Dioscorides and Pliny is the principal mode of administration at the present day. This remedy had long fallen into disuse, until it attracted the notice of Buchanan, who pointed out its efficacy. Among the Romans it was, as it is at present, used for dyeing and tanning leather. The rind or shell of the fruit, especially of the wild plant, is a valuable tonic and astringent, and is held in high repute by natives in dysenteric affections, combined with some aromatic and opium. It has also been administered with benefit in leucorrhœa. In the process of dyeing and tanning it is much used. It occurs as a hard leathery substance, usually in fragments of a reddish brown color, smooth externally, and of an astringent bitter taste. It contains 18·8 per cent. of tannin, 10·8 of extractive, and 17·1 of mucilage. The ripe fruit is much relished both by Europeans and natives, and it is said that the production of Cabul, besides being larger, is more luscious and pleasant-flavored. The cultivated fruit in Western India is also considered good, but less luscious. The acid juice contained in the red succulent pulp which covers the seeds is extremely pleasant to the taste, not unlike the orange. It is refreshing, and forms an agreeable beverage for persons suffering from fever. Native practitioners prescribe it in combination with saffron, when the habit is preternaturally heated. The Arabians and Persians place it amongst their *cardiacs.* The flowers of the male plant they rank amongst their *styptics.* Sloane in his *Natural History of Jamaica* mentions the leaves of the pomegranate tree, beaten and mixed with oil of roses, as being applied to the head for the cure of headaches.—(*Lindley, Ainslie, Pharm. of Ind., Roxb., Royle, Birdwood, Pharm., Graham, Dr. Stewart, Crawfurd's Ind. Arch.*)

Myrtus communis, *Willd.*; *Roxb. Fl. Ind. ii.* 498. *Common Myrtle.*

Linn. Syst. *Icosandria Monogynia.*

The berries.

Vernacular—Velaytee-mayndee, *Hind.*; As, Abiree, *Arab.*; Burghi-moorad, *Pers.*; Hub-ul-as, *Punj.*; Abhoolas, *Sind.*

A well-known shrub, native of Europe, Asia, and Africa, and known from the earliest times. It was a great favorite among the ancients for its elegance and its evergreen sweet leaves, and for the buds and berries which were eaten by them as spices. They are said to be yet used as such in Tuscany in lieu of pepper, and a wine is prepared from them there, called *Myrtidanum.* The distilled water of the flowers is that very agreeable perfume known as *Eau d'Ange.* Its leaves are officinal and used in cerebral affections, and the fruit as a carminative and in dysenteric affections.—(*Loudon, Ainslie, Lindley, Pharm. of Ind.*)

Psidium pyriferum, *Roxb. Fl. Ind. ii.* 480. *The Guava.*

Linn. Syst. *Icosandria Monogynia.*

The root and bark.

Vernacular—Jamb, *Hind.*; Payroo, *Dec.*; Peyaree, *Beng.*; Amrut, *Punj.*

A small tree, seldom rising above 20 feet in height; indigenous in the West Indies, Mexico and America; grown throughout India. The bark, and especially that of the root of the tree, is employed in chronic infantile diarrhœa, administered in decoction. A decoction of the leaves is said to have been frequently administered with success in epidemic cholera. The bark of the root Dr. Waiz found to be serviceable as a local application in the prolapsus ani of children. In Brazil the leaves are used for making medicated baths. The pleasant-tasted fruit is eaten, and is supposed to have some good effect in cases of diarrhœa.—(*Lindley, Pharm. of Ind., Birdwood.*)

Syzigium Jambolana, *Linn.*; *Roxb. Fl. Ind. ii.* 484.

Linn. Syst. *Icosandria Monogynia.*

The bark.

Vernacular—Jamoon, Jamun, Jambool, *Hind.*; Rukneo, Jamnee, *Punj., Sind*; Kala Jam, *Beng.* The bark—Jamansal, *Hind.*

A large tree growing everywhere throughout India. In the Sub-Himalayan tract and outer hills it extends west nearly to the Indus, and ascends to 3,000 feet in the Punjab, and 5,000 feet Kamaon. Forms large forests in Western India; cultivated in gardens in Kurrachee and Kotree.

The purplish black succulent fruit, which much resembles a damson, is eaten by natives. It has a harsh but sweetish flavor, and is somewhat astringent. The bark of the tree is strongly astringent and dyes excellent durable brown of various shades, according to the mordant employed or the strength of the decoction. A decoction of it often proves serviceable as a gargle in sore throats, and in other cases requiring astringents.—(*Roxb., Dr. Stewart, Brandis, Lindley.*)

Caryophyllus aromaticus, *P. S.* *Clove Tree.*

Linn. Syst. *Icosandria Monogynia.*

The unexpanded flower-buds.

Vernacular—Lowung, Loung, *Hind., Dec.*; Mykek, *Pers.*; Kurrun-phul, *Arab.*

A beautiful evergreen tree 30 to 40 feet high, very like a gigantic myrtle. A native of the Moluccas, and cultivated in the East and West Indies, Zanzibar, Bourbon, and Mauritius. According to Rumphius it was introduced into Amboyna before the arrival of the Portuguese, and is still cultivated there, and in the neighbouring islands of Haruka, Saparua and Nasalaut, also in Sumatra and Penang. It generally bears after its 15th year, and its average duration is 75 years.

The generic name of the plant is supposed to be taken from the Yonanee and Arabic synonymes, *Kurrunphul, Kurphullon,* which the Greeks (Lindley) altered into *Caryophyllon.* The bud, on account of its resemblance to nails, is called clove (*Clou* Fr., *Clavo* Sp.), and has long been known to the Chinese. The first European author to mention it is Pliny, who describes it as a grain resembling pepper. *Cosmos Indicopleustes* in his *Topographia Cristinia,* written about A.D. 547, states it was imported to *Taprobane* (Ceylon) from China and other places. It was one of the articles on which duty was levied at Acon (the modern Acre), Palestine, at the end of the 12th century. The whole plant is aromatic, and the clove is extremely acrid and pungent, having aromatic, stimulant and carminative properties. The best will exude a little oil when pressed or scraped. The active properties of cloves are extracted by water and alcohol. They contain a volatile oil 18; a peculiar tannin 13; gum 13; resin 6; extractive 4; lignin, 28; water 18 = 100. The distilled oil is colorless when recent, but gradually assumes a red-brown color, having the odour of cloves and a pungent spicy taste. Sp. gr. 1·05 to 1·06—sinks in water. Cloves are used as a condiment all over the world. In medicine, as an aromatic stimulant and carminative. In atonic dyspepsia and in gastric irritability, especially in the vomiting of pregnancy, the infusion or volatile oil proves serviceable, but its chief use is as an aromatic adjunct to other medicines. Externally it is used in paralytic cases. A few drops saturated in a piece of cotton, and applied locally, immediately relieves the pain of tooth-ache.—(*Loudon, Lindley, Pharm., Pharm. of Ind., Ency. Britt.* vol. II. p. 660, *Royle, Roxb., Ainslie.*)

Sonneratia acida, *W. and A. Prod.* 327; *Roxb. Fl. Ind. ii.* 506; *Dalz. and Gibs. Bom. Fl.* 98. *Sour Sonneratia.*

Linn. Syst. *Icosandria Monogynia.*

Vernacular—Tewur, *Sind.*

A small tree, with drooping branches and tetragonal branchlets; leaves 3–4 by 1–1¾, oval, oblong, wedge-shaped at the base, thick, veinless; calyx 4–6 cleft; corolla 6-petalled, sometimes more; fruit globose, many-seeded.

Extremely abundant on the borders of the saline waters in the delta of the Indus, where it grows to 20 feet, also in the salt marshes and creeks. Common also in the delta of the Ganges and other tropical rivers, on the Malabar Coast, the Salsette side of the Sion Causeway, British Burmah, Ceylon, the Moluccas, and North Australia.

In Sind this tree yields an inexhaustible supply of fuel to the inhabitants of villages adjacent to the locality of production, whence it is also transported on camels into Kurrachee for sale, and forms the greater portion of the kinds collected for this purpose. It formerly was the chief supply of the river steamers, and was considered a good substitute for coal. It is used to the present day with a proportion of Tamarisk, *Ægeceras majus,* and Babool. The latter is not used alone, owing to the presence of pyroligneous acid, which has been found to corrode the copper fire-box plates of the engines.

The sour-sweet fruit is eaten by natives, and is also used as a poultice in sprains and swellings. The fermented juice of the fruit is said to be useful in arresting hæmorrhage.—(*Roxb., Graham, Dr. Heddle's Mem. Riv. Ind.*)

Melaleuca minor, *Smith.*

Linn Syst. *Polyadelphia Icosandria.*

The oil—Cajaputti, Cazaputty.

A native of Amboyna, where it is called *Daun Kitsjil.* The oil is prepared from the leaves of the plant by a process of distillation which is exceedingly tedious. In native pharmacy, in Sind, it is seldom prescribed, except in cases of paralysis, and not unfrequently in persistent headaches. Mixed with powdered chalk, and made into a paste resembling glazier's putty, it is used as a stopping for carious teeth.

ALLIANCE 53. *GROSSALES.*

N. O. 290. BARRINGTONIACEÆ,—*BARRINGTONIADS.* Lind.—Bal. N. O. 88.

Barringtonia acutangula, *Gaert.* *Acute-angled Barringtonia.*

Linn. Syst. *Monadelphia Polyandria.*

The fruit.

Vernacular—Summunderphul, *Hind.*; Ella, Middagass, *Cing.*; Tiwur, *Bombay.*

A large tree with cuneate, obovate leaves; is extremely handsome when in flower. The fragrant, dark-colored pendulous racemes of flowers give it a most elegant appearance in the wet season, and render it very suitable for growing in gardens. It is common in the interior of Ceylon, Bengal and Chittagong, and is grown in gardens in the Western Presidency. The fruit is said to be an invaluable remedy in coughs, colds, and asthma. The root has a slightly bitter but not unpleasant taste, and is considered by native practitioners a valuable medicine on account of its deobstruent and cooling qualities, given in decoction to the quantity of half a tea-cup twice daily. The seeds and bark are also employed, the latter, which is of a reddish color, is supposed to possess virtues similar to those of the *Cinchona officinalis.* The powdered bark is used to intoxicate fish. Mixed with chaff and pulse it is given as cattle fodder.—(*Roxb., Lindley, Ainslie, Graham, Birdwood, Brandis.*)

Careya arborea, *Roxb.* *Carey's Tree.*

Linn. Syst. *Monadelphia Polyandria.*

The flowers and fruit.

Vernacular—Bakoomba, Vakoomba, *Dec., Hind.*; Khumbee, *Punj.*

A large tree found in Guzerat, the Concans, Deccan, and Khandeish, also in Ceylon, Bengal, Burma, and Central Provinces. In the Punjab it is grown in gardens. The fruit is about the size of an apple, and has a peculiar unpleasant smell. Endlicher says that, although it is eaten, the seeds are suspicious. In native practice the flowers are administered in infusion by native midwives to heal ruptures caused by child-birth. The bark is used as an astringent, and coarse cordage is made from the fibres; also fuses for matchlocks from the inner bark.—(*Roxb., Graham, Dr. Stewart, Lindley, Brandis.*)

ALLIANCE 54. *CINCHONALES.*

N. O. 293. CINCHONACEÆ,—*CINCHONADS.* Lind.—Bal. 115.

Randia dumetorum, *Linn.* *Bushy Gardenia.*

Linn. Syst. *Pentandria Monogynia.*

The fruit.—Emetic nut.

Vernacular—Muenphul, Myphul, *Hind.*; Jouz-ul-kosul, *Arab.*; Jouz-ul-maindal, *Sind*; Gchela, Peear-aloo, *Dec.*

A tall armed shrub growing in Ceylon and the western parts of India. Extends some little way into the Punjab Siwalick tract. The powdered fruit is used as an emetic, and an infusion of the bark of the root also. The bruised root and fruit are thrown into ponds to intoxicate fish. The fruit, ground on a stone and applied to the tongue and palate, is esteemed by natives as a remedy in the foul tongue of children, and especially in fevers and teething.—(*Lindley, Tennent's Ceylon, Dr. Stewart, Birdwood.*)

Gardenia gummifera, *Roxb.* *Gummy Gardenia.*

Linn. Syst. *Pentandria Monogynia.*

The resin.

Vernacular—The resin—Dekamullee, *Hind.*, *Dec.*, *Beng.*; Kunkum, *Arab.*

A tall shrub or small tree growing in Arabia, Persia, Ceylon, the Concans, and Deccan, and the Southern Mahratta Country; also in the Circars, and Canara; supposed to be the *κάγκαμον* of Dioscorides, mentioned by him as an Arabian product, and the *Concanum* of Pliny according to Sprengel, who is the authority for the above Arabic synonyme.

The beautiful and powerful smelling resin yielded by this tree is little known in Europe. It is imported into Bombay in large quantities from Arabia to the present day, and is the produce both of the plant under notice, and *Gardenia lucida.* It occurs in the form of irregular earthy-looking masses, and is generally met with in the bazaars mixed with twigs and leaves. The odour is peculiar and offensive. It is much used by natives as an astringent for cleansing foul ulcers, and for allaying the irritation of the gums and checking diarrhœa during the teething of children. In hospital practice it is found useful in preventing access of flies to ulcerated surfaces. The people of Chittagong employ the fruit of *G. campanulata* as a cathartic and anthelmentic.—(*Birdwood, Lindley, Roxb., Pharm. of Ind.*)

Uncaria gambir, *Roxb.* *The Gambir.*

Linn. Syst. *Pentandria Monogynia.*

The extract of the leaves—Terra Japonica, Gambir, Japan earth.

Vernacular—Kath, Kutha, *Hind.*

A stout climbing shrub, native of the countries bordering the Malacca Straits. From the leaves of this plant is prepared by the Malays a sweetish astringent extract, under the above English synonyme, which is chewed with betel leaf by the natives, and also used to relieve aphthous eruptions of the mouth and fauces. It is much employed in tanning, being a powerful astringent.—(*Ainslie, Birdwood, Pharm. of Ind., Pharm., Lindley.*)

Oldenlandia retrorsa, *Boiss. Fl. Orient. iii.* 12; *Hk. Fl. Br. Ind. iii.* 68.

A slender annual with retrorsely scabrid stems; leaves ¾–1 in. in fascicled whorls, linear-oblong, obtuse, flat, scabrid; flowers on long, glabrous, spreading cymes; capsules sessile, pedicelled, ⅛ in. diameter, glabrous.

Kurrachee (Sind), also Arabia.

Oldenlandia corymbosa, *Linn.*; *Hiern. in Oliv. Trop. Africa. iii.* 62; *Hedyotis Burmanniana, Dalz. Bomb. Fl.* 116; *Hk. Fl. Br. Ind. iii.* 84.

A very variable glabrous annual; leaves linear or narrowly elliptic-lanceolate; stipules small, membraneous; peduncles solitary, 1–4 flowered; calyx teeth subulate.

Abundant in Sind and Punjab as a weed.

N. O. 295. GALLIACEÆ,—*STELLATES.* Lind.—Bal. N. O. 116.

Rubia Munjista, *Roxb.* *Rubia cordifolia, Linn.* *Indian or Bengal Madder.*

Linn. Syst. *Tetrandria Monogynia.*

The root and seeds.

Vernacular—Munjeet, Munjista, *Hind.*; Kukkurfullee, *Punj.*

A scandent plant, native of Siberia; cultivated to a great extent in Assam, Nepaul, Lower Thibet, Sind, China, Central and Western India, and some parts of Persia. Grows abundantly in many parts of the Punjab Himalaya, and occurs in the Sulimman range. It yields the munjeet of India much used for dyeing purposes. This dye is brought into India from the West, as well as from Nepaul. From the Punjab as well as from Afghanistan direct, it is brought to Sind, and sent to Bombay for export to England. England was formerly supplied with this dye (the product of *R. tinctorum*) exclusively from Holland, but owing to its dearness in times of political derangement, an attempt was made to cultivate it, which, from all accounts, proved successful, but it could not be sold at the price at which it was formerly supplied.

There appears to be little doubt but that the roots of the species under notice are what the Greeks called *ἐρυθρόδανον*, and which Pliny says the Romans termed *rubia* and dyed leather with. In the Middle Ages, according to Beckmann (*Hist. of Inventions*), it was called *Varantia*. Madder is extensively used as a dye-stuff in Sind and the N. W. Provinces; also in the Punjab. In Afghanistan it is also made use of, but that is the produce of *R. tinctorum*, a species having thicker and more succulent roots, and thought to be the same as the European kind. The Smyrna and Dutch madder roots are however considered to be superior. These consist of articulated fibres of the thickness of a goosequill, are red throughout, have a weak smell and a bitterish taste. For the use of the dyers they are first peeled and dried, then bruised and packed in barrels.

Madder tinges with a florid red the whole system of animals that feed on it, the milk, bones, and urine not excepted, and, in addition to its valuable dyeing qualities, has been successfully used as a tonic, diuretic, and emmenagogue. Dr. Playfair in a note appended to his translation of the *Taleef Shereef* (p. 120) states that, if taken to the extent of about 3 drachms several times daily, it powerfully affects the nervous system, inducing temporary delirium, with evident determination to the uterine system. An infusion of it is given as a grateful and strengthening drink to weakly women in cases of scanty lochial discharge. Dr. Thompson (*London Disp.*) recommended it in jaundice and in the atrophy of infants, but it is now seldom used or thought of. The French writers on Materia Medica at one time spoke in high terms of its virtue in obstructions of the liver, dropsy, and *fluor albus*, but they too seem to have since considered it of little real utility.—(*Dr. Stewart, Loudon, Pharm. of Ind., Lindley, Ainslie, Duncan's Edin. Disp., Royle, Agri-Hort. Rep. Beng.*)

ALLIANCE 55. *UMBELALES.*

N. O. 296. APIACEÆ,—*UMBELLIFERS.* Lind.—Bal. N. O. 110.

Eryngium Billardieri, *Delaroche Eryng.* 25, *t.* 2; *DC. Prod. iv.* 88; *Bois. Fl. Orient. ii* 825; *Hook. Fl. Br. Ind. ii.* 670.

An erect perennial, 6–18 inches high, often branching from the base; radical leaves 2–4 in. dia., long-petioled, 3-partite; segments 3-fid or pinnatifid, spinous toothed; petiole 2–4 in.; bracts 5–7, 1 in. linear, with few or O. spines on the margins; short spines alternate with and sometimes exterior to the bracts; bracteoles linear, spinulose, simple, exceeding the flowers; calyx-tube with lanceolate scales, teeth lanceolate—subulate, spinescent; fruit $\frac{1}{8}$ in.

Occurs in Sind, Kashmir to 6,000 ft., and Ladak. Distributed in Western Asia.

Ptychotis ajowan, *DC. l. c.* 109. *Bishopsweed Seed.*

Linn. Syst. *Pentandria Digynia.*

The fruit, and crystalline substance collected from the surface of the distilled water.

Vernacular—Ajwan, Juwanee, Borojoan, *Hind., Beng.*; Wowah, *Dec.*; Amoos, *Arab.*; Nankah, *Pers.*; Ajwan, *Sind.*

An erect annual, cultivated everywhere in India, Egypt, and Persia. It is one of the most useful of the umbellifers. The small warm, aromatic seed, resembling that of anise in its virtues, is an excellent remedy in flatulency and colic, and is considered by native practitioners as cardiac and stimulant. According to Dr. Bidie, it increases the flow of saliva, and augments the secretion of the gastric juice. As a topical remedy it may be used with advantage, combined with astringents, in cases of relaxed sore throat. In some forms of dyspepsia, in the vomiting, griping or diarrhœa arising from errors of diet, faintness, exhaustion, and hysteria, it has also been found serviceable administered alone. It is also valuable for disguising the taste of nauseous medicines. The distilled water, procurable from all druggists, is a popular remedy in India for children suffering from flatulency, and is always administered to them with purgatives to obviate griping.

Under the name of *Ajwain-ka-phul* there is sold in the bazaars of the Deccan and Sind, and other towns, a crystalline substance which was first brought to notice by the late Dr. Stocks, who states that it is prepared from the seeds at Oojein and elsewhere in Central India during the cold season, and also that it forms spontaneously on the surface of the distilled water. This substance was examined by Stenhouse and Harris, who showed its identity with Thymol C. 10, H. 14. O. It is very commonly prescribed by native practitioners in colic and coughs, and is considered also a good anti-spasmodic.—(*Ainslie, Roxb., Pharm., Pharm. of Ind., Waring's Bazaar Medicine.*)

Pimpinella anisum, *W.* *Anise.*

Linn. Syst. *Pentandria Digynia.*

The fruit—Anise seed.

Vernacular—Souf, Anesum, *Hind.*, Burree-shep, *Dec.*; Muhoree, *Beng.*; Anesoon, *Arab.*; Razanee, Roomee, *Pers.*

This is an annual, indigenous to the Greek Islands and Egypt, cultivated in Europe and India. The aromatic, sweetish, warm-tasted seed, which so closely resembles sweet fennel seed, and which the ancients chiefly obtained from Crete and Egypt, is among the oldest of medicines and spices, and is at the present day imported into England from Malta and Spain for use in medicine. It is much employed as a stomachic, and contains a colorless essential oil of sp. gr. 0·983 obtained by distillation, which is a valuable adjunct to other medicines, and is largely consumed in the manufacture of cordials, chiefly in France, Spain, Italy, and South America.—(*Lindley, Loudon, Pharm., Ainslie, Duncan's Edin. Disp.*)

Fœniculum vulgare, *Gaertn. Fruct. i.* 105, *t.* 23. *Indian Fennel.*

Linn. Syst. *Pentandria Digynia.*

The fruit—Fennel seed.

Vernacular—Panmohree, Sonf, *Hind.*, *Sind*; Wareealee, *Guz.*

Cultivated throughout India A very useful stomachic and carminative. The root under the name of *Bekh karafsh* is considered in the Punjab alterative and diuretic, and given in anasarca and colic.—(*Stewart, Punj. Pl.*)

Ferula Persica, *W.*

Linn. Syst. *Pentandria Digynia.*

The gum resin—Sagapenum.

Vernacular—Kundel, *Hind.*; Sujbenuj, *Arab.*, Sagafioon, *Pers.*

Sagapenum, like Opoponax, has been known to us since the time of the Greeks. Dioscorides describes it as the produce of a Ferula growing in India, and we have no more recent information. It is the Sukbeenuj of the Arabs, who give *Sagafioon* as its Greek name. It reaches India from the Persian Gulf or the coasts of Arabia. It is imported into Europe through the Levant, and also from Alexandria, and is probably a product of Persia. Wildenow was of opinion that it was produced by

Ferula Persica, which Olivier thought produced *Ammoniacum*, and Dr. Hope *assa-fœtida*. Dr. Lindley considers it between *Galbanum* and *Ammoniacum*, but the origin of it is not ascertained with any certainty. It is thought to be derived from *F. Persica* or *F. Szowitsiana*. In medical pharmacy it was often called Serapinum. It is so frequently mentioned by the older writers that it must have been then plentiful. At the present day it can scarcely be procured genuine even at Bombay, where it is sometimes brought from Persia. When *pure*, Sagapenum forms a somewhat waxy mass and is sometimes in tears, having an alliaceous odour and acrid taste. It is considered a good antispasmodic, but less powerful than assafœtida.—(*Royle, Lindley, Pharm.*

Opoponax chironum, *Kach.*

Linn. Syst. *Pentandria Monogynia.*

The gum resin.

Vernacular—Juvashur, Ganshur, *Hind., Pers.*

This resin (Opoponax) has been identified as the produce of *Opoponax chironum*, a plant resembling parsnip, a native of the Mediterranean, and found also in France, Italy and Syria. It is referred by Sprengel to the genus Ferula. Dr. Lindley (*Fl. Med.* p. 100) describes the fruit of a species of Ferula which he names *F. Hoshee*, and of which the produce is said to resemble opoponax, according to a letter from Mrs. McNeil. Dr. Royle states it to be imported into India from Arabia, and into England from Asia Minor. It occurs in hard, brittle, irregular-shaped but angular pieces of a reddish-yellow or orange color, has a strong fœtid odour much like crushed ivy leaves, and a bitter acrid taste. Sp. gr. 1·62. From 50 grammes of this resin Pellitier obtained resin 21, gum 16·70, extractive 0·80, starch 2·10, malic acid 1·40, lignin 4·90, wax 0·15, volatile oil and loss 2·95, caoutchouc a trace (Ch. and R.)

It formerly enjoyed much repute, as its name indicates, and was an ingredient in Theriaca. In action it resembles assafœtida, and is very serviceable in antispasmodic affections.—(*Royle, Lindley, Loudon, Pharm., Supp. Duncan's Disp.*)

Narthex assafœtida, *Falc.*; *Ferula Narthex. Boiss. Fl. Orient. ii.* 994.

Linn. Syst. *Pentandria Digynia.*

The gum resin.

Vernacular—Hing, *Hind., Dec., Beng.*; Angooza, *Afg.*; Barzud, *Beng.*

This plant would appear to occur in the greatest abundance in the provinces of Khorassan and Laar in Persia, and thence to extend on the one hand into the plains of Turkestan on the north of the Hindoo Koosh, where it seems to have been met with by Sir Alex. Burnes, and on the other to stretch across from Beloochistan through Kandahar and other provinces of Afghanistan to the Eastern side of the Valley of the Indus. It also occurs at about 6,000 feet in the Punjab, and Cleghorn mentions specimens being brought to him on the upper Chenab at over 8,000 feet. In Afghanistan the plant grows wild, and abundantly on the plains to the west of Kelatee Ghilzi (7,000 feet). The chief supply of resin is obtained from the hills north of the Bolan Pass and about the Helmand, according to Bellew, who mentions that in Afghanistan the leaves also have an alliaceous smell, and are used as vegetable. The succulent part of the young stem is eaten after roasting with salt and butter. In his notes on articles of cultivation suitable to Sind, Dr. Stocks states in reference to myrrh, frankincense, euphorbium, galbanum, ammoniacum, sagapenum, assafœtida, tragacanth, and mastich, that the climate of Sind (especially the higher parts of it) seems particularly suited to the development of the odoriferous and fœtid gum resins, which require a certain amount of cold. This is confirmed by the googul tree yielding abundance of that gum resin in Sind; by the occurrence of three kinds of assafœtida and a kind of mastich in the elevated Beloochistan hills; and by the Tamarisks yield-

ing manna all over Sind, which Dr. Royle and other authorities deny ever occurring in India or out of Arabia and Persia. Natives who live solely on vegetable food are partial to this gum as a condiment. It is the most powerful of all the fœtid resins, and is a most valuable remedy. It acts as a stimulant, antispasmodic, expectorant, and emmenagogue, and its action is quick and penetrating. It proves especially serviceable in spasmodic croup, dyspepsia and asthma.—(*Royle, Pharm., Lindley, Dr. Stewart, Dr. Stocks, Duncan Edin. Disp., Blanc's Abyssinia, Mason's Beloochistan.*

Anethum sowa, *Roxb. Fl. Ind. ii.* 94.

Linn. Syst. *Pentandria Digynia.*

The fruit—Indian Dill seed.

Vernacular—Sowa, Sutopsha, *Hind.*; Soolpha, *Beng.*; Sooah, *Guz.*; Shubit, *Arab.*; Soya, *Punj.*

A native of Southern Europe; cultivated in many parts of India for its aromatic fruit (Dill seed). It has no specific character to distinguish it from the European species (*A. graveolens*), but on account of a slight peculiarity in its fruit, both Roxburgh and DeCandolle regarded it as a distinct species, and named it *A. Sowa.* It is the *Anethum* of Palladin and other old writers as well as of the New Testament, where it is mentioned among the things tithed, but it has been rendered *Anise* by the English translators from Wickliffe downwards. The flattened elliptical fruits yield by distillation a volatile oil soluble in alcohol, ether, and 144 parts of water. In the Punjab, where it is cultivated, the plant is used as a vegetable, and the seeds are considered emmenagogue. Dill seed is eaten by natives after meals to relieve flatulency. The distilled water proves effectual in the flatulency and colic of children. The leaves applied warm and moistened with a little oil hasten suppuration.—(*Pharm. of Ind., Ainslie, Pharm., Dr. Stewart, Royle.*)

Cuminum cyminum, *Linn.* *Common Cummin.*

Linn. Syst. *Pentandria Digynia.*

The fruit—Cummin seed.

Vernacular—Jeera, zeera, *Hind., Beng., Dec.*; Zeero, *Sind*; Zira safaid, *Punj.* The generic name is from the Arabic synonyme Quanoum or Kimoon.

An annual, indigenous to the upper regions of the Nile, but carried at an early period by cultivation to Arabia, India, and China, as well as to the countries bordering the Mediterranean. Made known to the Greeks from Egypt Extensively cultivated in Sicily and Malta, whence England is chiefly supplied; also in Southern and Western India.

Bellew mentions it as growing wild on the the hills north of the Peshawur valley; and Aitchison states that it is common, *wild,* in Lahoul (10,000 feet). It is also found in the Sutlej Valley between Rampur and Sangnum, whence the seeds are exported to the plains.

Cummin is alluded to in Scripture in the xxviii chap. of Isaiah and in the xxiii chap. of Matthew as one of the tithed productions of the Holy Land. The fruits are of an ash grey or light brown color, oval, linear, flat on one side, convex and striated on the other. Their warm, bitterish taste, and aromatic odour, reside in a volatile oil, which when extracted is of a pale yellow color and disagreeable taste. Sp. gr. 0·347. Both fruit and oil possess carminative properties analogous to Coriander and Dill, and though the seeds are officinal in the London Pharmacopœa, they are rarely employed in medicine by Europeans. Both oil and seeds are much valued in native practice. The latter are used largely as an ingredient in curry powder, and being considered inimical to the fœtus are employed as abortifacient, and also as preventive to pregnancy. They are in general use among the natives as a grateful stomachic in cases of dyspepsia, and according to Celsus have been used with advantage in affections of the spleen. The French medical practitioners esteem them as "*Excitants, Carminative*

et Aperitives," and formerly considered them to be diuretic and emmenagogue. In the Punjab they are thought diuretic and lactagogue. In veterinary practice they are also largely used.—(*Royle, Roxb., Pharm. of Ind., Dr. Stewart, Cleghorn Punj. Rep., Pharm., Spratt's Crete, Duncan's Edin. Disp., Graham, Cat. of Bombay Plants.*)

Daucus carota, *W.* *Carrot.*

Linn. Syst. *Pentandria Digynia.*

The seed.

Vernacular—Pitta Gajur, Gujjur. The seed—Gujjur-jo-beej, *Sind*; Gahzar, *Hind., Dec.*; Mor, Balmuj, *Punj.*

Carrots, which in the low provinces of the southern parts of the peninsula are grown in the gardens of Europeans, and in those of a few rich natives, are cultivated in great abundance in the Concan, Deccan, Mysore, Sind, and Madras, where they are of a fine quality, and eaten by the inhabitants. In the Punjab plains towards the west, the carrot is cultivated and given to horses, whose coat it is said to improve. It is also found commonly wild, from 3,200 to 5,000 feet in Kashmere and some of the neighbouring tracts. Carrots appear to have been first introduced into India from Persia. Pliny tells us (b. xxv. c. 9) that the finest kind of carrots were in his day supposed to be those of Candia and Achaia. In England they do not seem to have been known previous to the reign of Elizabeth. Celsus mentions that the seeds of the carrot of Crete were an ingredient in the famous Mithridate, which secured the body against the effects of poison (Lib. V. pp. 231, 232). It is the σταφυλῖνος ἀγρίος of Theophrastus, according to Fraas, and the σταφυλῖνος of Dioscorides and probably of Pliny also. The Arabs give *Istufleen* as its Greek name—a corruption, no doubt, of *Staphulinos*. They place it among their Aphrodisiaca, a proof that they never could have supposed them indigestible, which they have been reckoned by some. They are employed by European practitioners in the form of poultice to correct the discharge of ill-conditioned sores. In Europe the seeds, which are carminative and diuretic, were believed to be efficacious in gravel, and the red flowers in the centre of the umbels in epilepsy. In the Punjab as well as in Sind they are considered aphrodisaic, and also given in uterine pains. The wild variety has fusiform roots, which are small, yellowish, woody, with a bitter acrid taste, but with the peculiar odor of the carrot. The seeds have an aromatic smell, warm and pungent taste, and yield by distillation a volatile oil which is secreted in the fruit and diffused in less quantity over the whole plant.—(*Dr. Stewart, Ainslie, Birdwood, Royle, Agri-Hort. Socy., Duncan's Edin. Disp.*)

Coriandrum sativum, *W.* *Common Coriander.*

Linn. Syst. *Pentandria Digynia.*

The fruit.

Vernacular—Dhunnia, *Hind., Beng., Dec.*; Kazeera, *Arab.*; Kushneez, *Pers.*; Kurban, *Egypt.*; Dhanya, *Punj., Sind.*

A small glabrous annual occurring as a cornfield weed throughout temperate Europe and widely throughout India. It is mentioned by Moses, Hippocrates, Theophrastus, Dioscorides and Pliny, being the κορίαννον and κόριον of the Greeks; derived from *Koris* (a bug), owing to the offensive odour it exhales when handled. It was the *Gad* of the Hebrews. Celsus speaking of coriander (Lib. II. pp. 90, 91) says "*Coriandrum refrigerat urinam movat.*" Murray in his *Apparatus Medicaminum*, vol. I. p. 406, recommends an infusion of the seeds in cases of quartan ague. Coriander seeds are reputed stimulant, carminative, grateful, stomachic, and gently laxative. The composition of the essential oil indicated by the formula is C. 10, H. 18-0. Everywhere in the Bombay and Madras Presidencies, the young plant is used as a condiment and for flavoring in cookery under the name of *Kothmere.* In the Punjab it is eaten as a vegetable. The seeds or fruits are used in curry powder, of which they are the chief ingredient. Medicinally they are employed in decoction for colic, and also for covering the taste of nauseous medicines. They are used in veterinary practice, and by the distillers of gin.—(*Royle, Ainslie, Pharm. of Ind., Birdwood, Pharm.*)

Apium garvoolens, *Linn. DC. Prod. iv.* 101. *Celery.*

Linn. Syst. *Pentandria Digynia.*

The seeds.

Vernacular—Ajmodh, Karásh, *Hind.* The roots—Bek-karash.

Cultivated. The root is considered alterative and diuretic, and the seeds stimulant. —(*Stewart.*)

Carum carui. *Linn.* *Common Caraway.*

Linn. Syst. *Pentandria Digynia.*

The fruit—Caraway seed.

Vernacular—*Zeera* Syah, *Hind., Sind, Punj.*

Universally used as a stomachic and in confections.

Prangos pabularia, *Lind. in Quart. Journ. Sc. xix.* 7.

Linn. Syst. *Pentandria Digynia.*

The fruit.

Vernacular—Fiturasalioon, *Punj., Sind*; Komal, *Afg.*

Occurs wild in Ladak at 10,000 ft., Kashmir at 5,000 to 6,000 feet, and in Afghanistan around Ghuznee where it is browsed by cattle The fruit or seed is reputed stomachic. Water in which the plant is steeped destroys snails, and its roots are said to be a valuable remedy in the cure of itch.

Psammogeton biternatum, *Edgew. in Trans. Linn. Socy. xx.* 57. *P. crinitum, Bois. Fl. Orient. ii.* 1078.

A small annual, pubescent or glabrous; stem 2–8 in. divaricately branched, pubescent; leaves 1–2 pinnate; pinnæ laciniate; umbels compound; bracts and bracteoles many, small, lanceolate, 3–8, $\frac{1}{4}$–$\frac{1}{2}$ in. narrowly lanceolate or linear; peduncles 1–3 in. stout, lateral and terminal; calyx-teeth obsolete; petals obovate, emarginate, white or purplish; fruit small, ovoid, slightly villous.

Common in the Punjab plains, Beloochistan, and Sind; also in the Himalaya to 3,000 feet. Reputed stomachic.

ALLIANCE 56. *ASARALES.*

N. O. 301. SANTALACEÆ,—*SANDALWORTS.* Lind.—Bal. No. 190.

Santalum album. *True Sandalwood.*

Linn. Syst. *Diadelphia Decandria.*

The wood—Sandalwood.

Vernacular—Chundun, Sufaid Chundun, *Beng., Hind.*; Sundel, *Dec.*; Sookhud, *Guz.*; Sundul Sufaid, *Pers.*

This valuable tree is found in abundance on the hills which separate the Coimbatore districts from Mysore; sparingly in Canara, and grows both in the gardens and jungles in the Deccan.

It is considered by Sprengel to be the Almug tree of 1 Kings x 11. It is mentioned in the Sanscrit writings as *Chundana*, and occurs in the Nirukta, or writings of Yaska, the oldest Vedic commentary. According to Wathen (*Voy. to China*, 1812, p. 116) it sells so high that the tree is seldom allowed to grow to more than a foot in

diameter. It is manufactured into musical instruments, cabinets, *escritoires* and similar articles, as no insect can exist or iron rust (it is said) within its influence. It is of the dust of this wood that the Brahmins form the pigments which they use in giving the *Tiluk* or frontal mark to the God Vishnoo, and themselves as a caste mark. The sandalwood from Malaya is held to be the best throughout India, and is esteemed by native doctors as possessing sedative and cooling qualities, and as being a valuable medicine in gonorrhœa.

In India the wood is burnt as a perfume in houses and temples and at the funeral ceremonies of the Hindoos. Large offerings of it are made by the Parsees to their fire-temples. It is also much used in making work-boxes, walking canes and other small as well as large articles. In cases of morbid thirst it is recommended to be taken in cocoanut water, and in hot weather, after bathing, the powder is rubbed over the body, equally to cool it, and check too copious perspiration. The most important constituent is the essential oil of the wood, of sp. gr. 0·963. In gonorrhœa it is regarded as superior to both copaiba and cubebs, having been found to succeed when both these medicines had previously failed.—(*Royle, Lindley, Loudon, Pharm., Ainslie, Pharm. of Ind.*)

N. O. 303. ARISTOLOCHIACEÆ,—*BIRTHWORTS.* Lind.—Bal. No. 191.

Aristolochia rotunda, *W.* *Round Root Birthwort.*

Linn Syst. *Gynandria Hexandria.*

The root.

Vernacular—Zeerawund, Moderaj, *Hind., Dec.*

Found in the jungles of Ceylon, Madras and the Circars. The roots of this, as also those of *A. Indica* and *A. longa,* are said to possess emmenagogue and antarthritic virtues. An infusion of the fresh bruised or dried leaves mixed with castor oil, is considered a valuable remedy in obstinate psora. In the bites of venomous snakes it formerly stood in high repute, but is now disregarded.—(*Lindley, Loudon, Pharm., Pharm. of Ind.*)

LIST OF DRUGS IN COMMON USE IN THE PROVINCE OF SIND,

Added at the special request of the Government of Bombay, on the suggestion of Dr. H. V. Carter, Professor of Botany, G. M. C.

Natural order.		Product.	Page
130	Abelmoschus esculentus, *Linn.*	The seeds	63
209	Abrus precatorius, *W.*	The seeds	126-128
130	Abutilon indicum, *W.*	The plant	59
209	Acacia catechu, *W.*	The extract of the wood	138
209	Acacia arabica, *Linn.*	The bark and gum	137
194	Achyranthes aspera, *W.*	The tops	101
154	Aconitum napellus, *L.*	The root	74
59	Acorus calamus, *W.*	The root	22
209	Adenanthera pavonina, *W.*	The wood	135
24	Adiantum capillus veneris, *Linn.*	The leaves	8
170	Ægle marmelos, *Corr.*	The fruit	79
194	Ærua lanata, *Jus.*	The flowering tops and root.	101
6	Agaricus campestris, *Linn.*	The dried fungi	7
209	Agati grandiflora, *Rheede.*	The bark	118
209	Alhagi maurorum, *Tournf.*	The plant and manna	123
62	Aloe socotrina, *Haw.*	The inspissated juice of the plant.	23
49	Alpinia galanga, *W.*	The root	20
130	Althæa rosea, *W.*	The plant	57
194	Amaranthus spinosus, *W.*	The root and leaves	103
218	Ammannia vesicatoria, *Roxb.*	The leaves	143
210	Amygdalus communis, *W.*	The seeds	140
174	Anacardium occidentale, *Linn.*	The nut or seeds	88
263	Andrographis paniculata, *W.*	The herb	178
296	Anethum sowa, *Roxb.*	The fruit	199
152	Anona squamosa, *W.*	The dried fruit	72
273	Anthemis nobilis, *W.*	The flowers	183
264	Antirrhinum glaucum, *J. E. S.*	The leaves and flowers	179
220	Aquilaria agallocha, *Linn.*	The wood	145
109	Arachis hypogea, *Linn.*	The oil	122
38	Areca catechu, *W.*	The extract and nut	17
156	Argemone mexicana, *Linn.*	The seeds	76
303	Aristolochia rotunda, *W.*	The root	202
273	Artemesia indica, *W.*	The leaves and top	184
273	Artemesia sternutatoria, *W.*	The powdered leaves	184
303	Asarum Europæum, *W.*	The root	.....
62	Asparagus officinalis, *W.*	Asparagus	24
62	Asparagus sarmentosus, *W.*	The root	24
62	Asparagus satawur, *Roxb.*	The root	24
209	Astragalus hamosus, *W.*	The pod	118
273	Aucklandia costus, *Falc.*	The root	185
257	Avicennia tomentosa, *Linn.*	The bark and root	176
173	Azadarichta indica, *Linn.*	The fruit	84
171	Balanites ægyptiaca, *Wall.*	The fruit	.....
171	Balsamodendron gileadense, *Kunth.*	The oleo resin	82
171	Balsamodendron myrrha, *Nees*	The gum resin	82
171	Balsamodendron pubescens, *J. E. S.*	The gum resin	80

Natural order.		Product.	Page.
171	Balsamodendron mukkul, *Hook.*	The gum resin	81
29	Bambusa arundinacea, *Schreb*	The siliceous secretion of the female plant.	12
63	Barleria longifolia, *W.*	The seeds and root	178
290	Barringtonia acutangula, *Gaert.*	The fruit	194
199	Basella alba, *Linn.*	The flowering tops and leaves	106
159	Berberis aristata, *DC.*	The extract	78
159	Berberis lycium, *Royle*	The extract	77
273	Berthelotia lanceolata, *DeL.*	The leaves	183
78	Betula Bojputhra, *Wall.*	The bark	28
126	Bombax heptaphyllum, *Cav*	The gum	55
171	Boswellia papyrifera, *Hoch*	The gum resin	80
123	Brassica nigra, *W.*	The seeds	50
105	Bryonia scabrella, *W.*	The root	42
174	Buchanania latifolia, *Linn.*	The fruit	88
209	Butea frondosa, *W.*	The seeds, flowers and gum.	124
125	Cadaba farinosa, *W.*	The leaves	53
191	Calligonum polygonoides, *Linn.*	The root	98
74	Callitris quadrivalvis, *Rich.*	The resin (Sandarach)	27
144	Calophyllum inophyllum, *Lind.*	The flowers dried and leaves	70
239	Calotropis gigantea, *H. K.*	The bark, root and milky juice dried.	160
144	Calysaccion longifolium, *W.*	The flower bud	...
86	Cannabis sativa, *W.*	The herb and resin	30
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